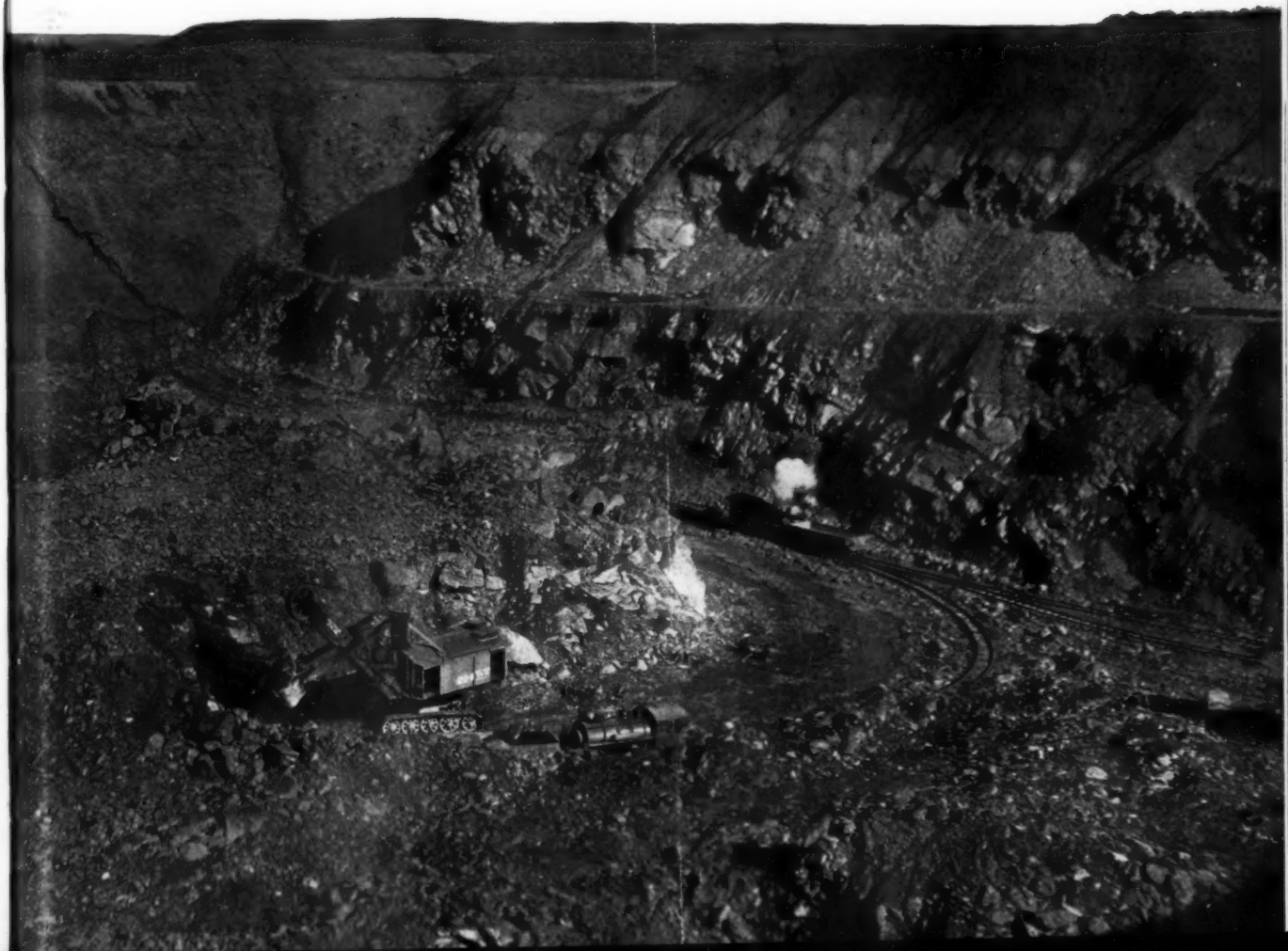
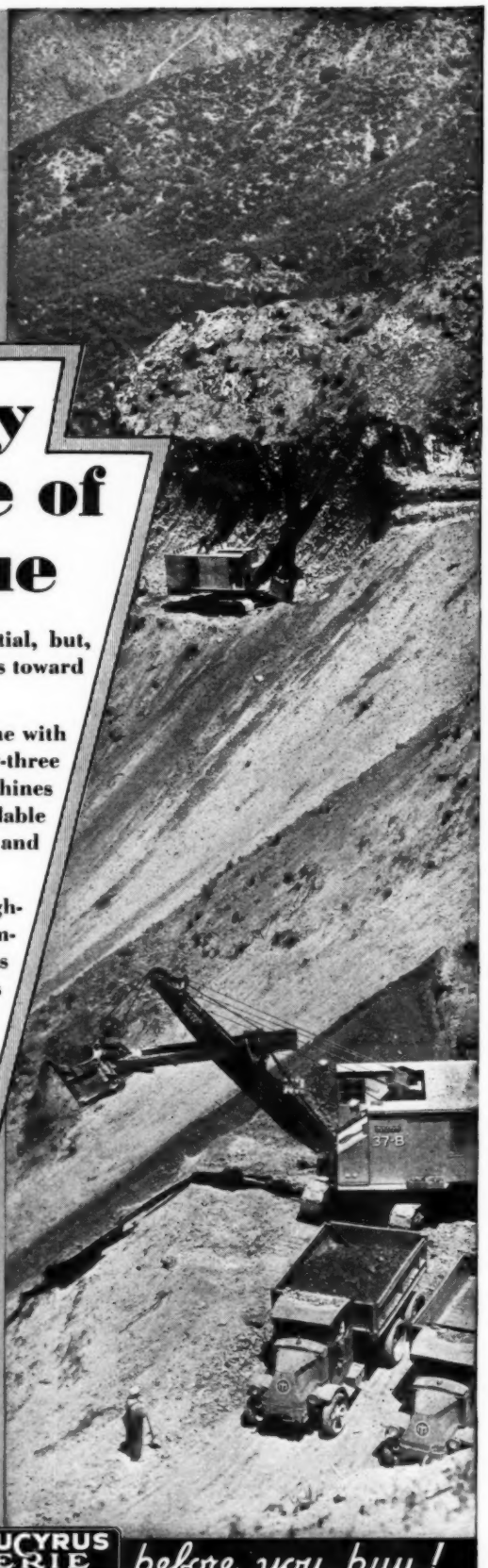
Vol. XXVII SEPTEMBER 1933 Number 9

# EXCAVATING ENGINEER

FOUNDED 1905

Looking down into the pit of the deepest coal stripping project in the world where A. E. Dick Contracting Company is uncovering the famous Glen Alden "Blue Coal". See Page 347.





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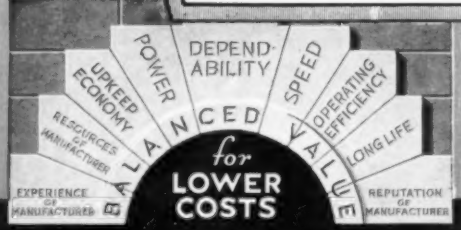


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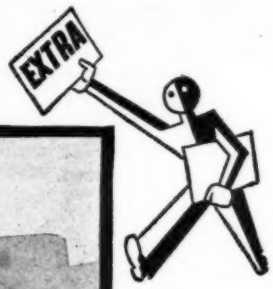


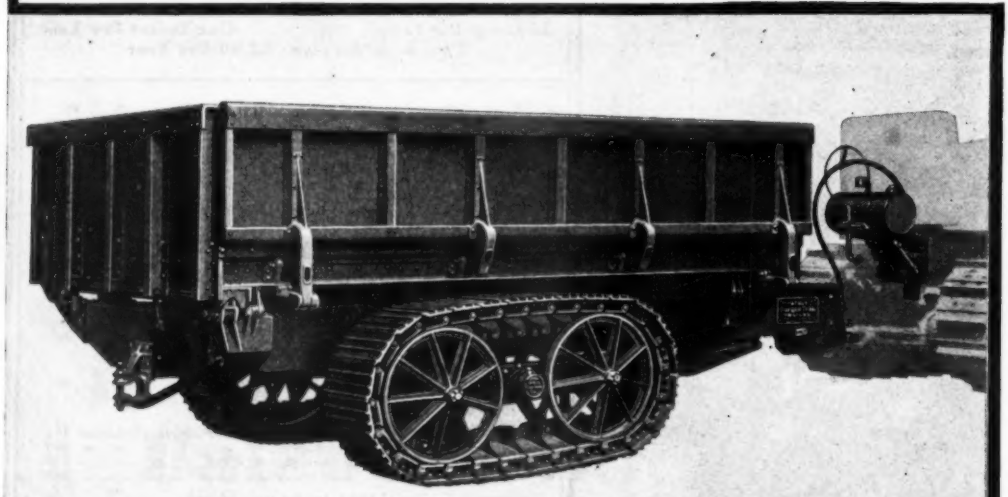

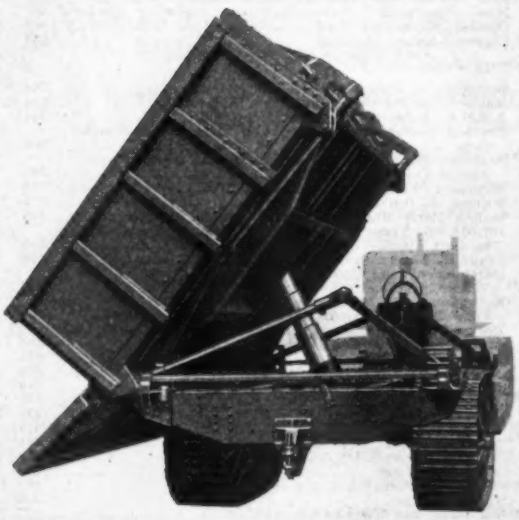

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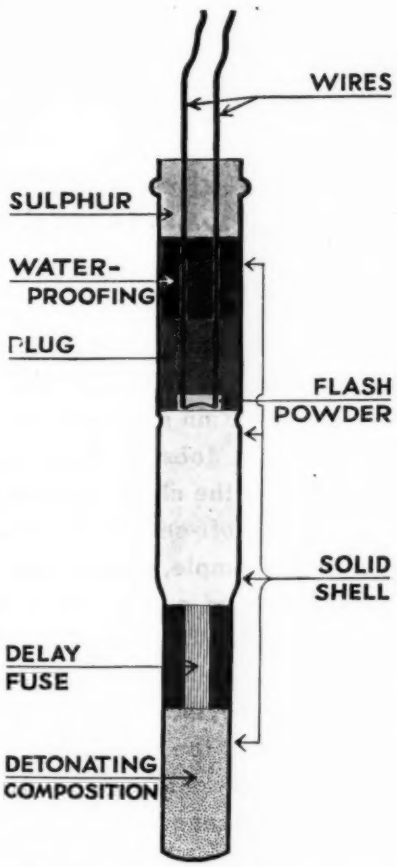

*Cross-section of the new Hercules delay. Note the simple construction: solid shell, no vents, no cooling devices required.*

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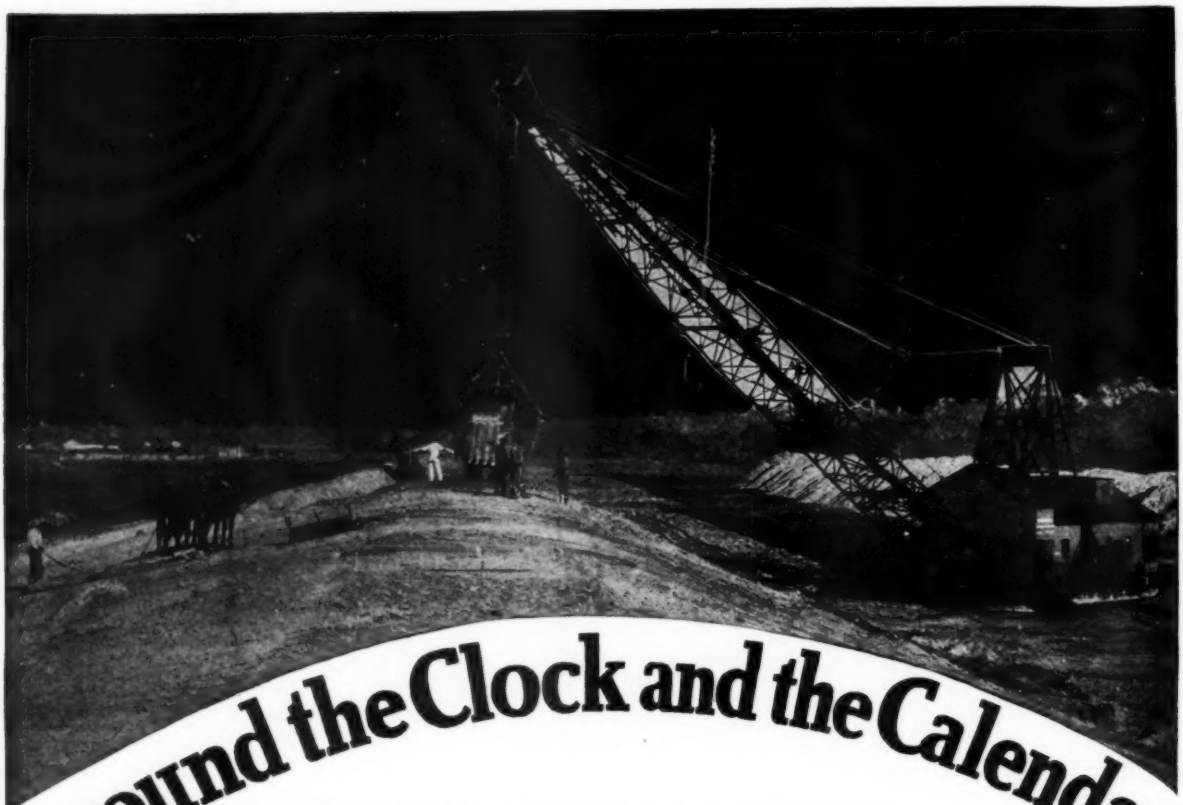

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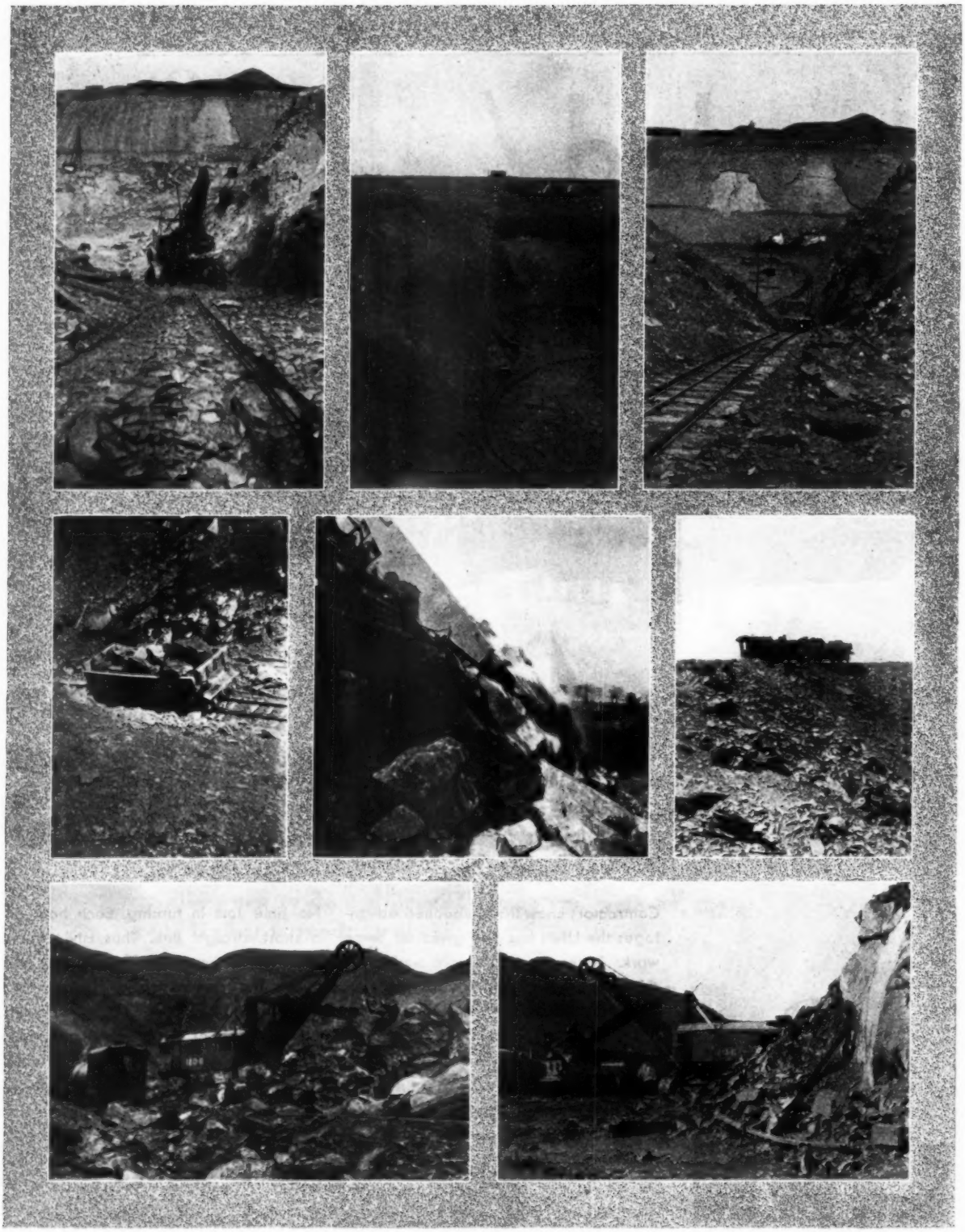

## Pit Views at Honeybrook

*Top, left to right: The 120-B eases itself down the 10% grade into the pit. The incline from the opposite bank, showing an empty just lowered into the pit, the hoist house at the top, and locomotives on the dump. Up the 1,600-foot incline comes a car loaded with 50 tons of rock. Center, left to right: Looking down on a carload of rock on its way up the plane. Another load of rock goes over the dump. Car being pushed up to the dump by one of the 18-ton Vulcan saddlebacks. Bottom, left to right: The 120-B with Pat Cortez operating. Another view of the ¾-yard Bucyrus-Erie loading rock.*

EXCAVATING ENGINEER
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SEPTEMBER, 1933
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# HONEYBROOK—the deepest hard coal strip mine

*A. E. Dick Contracting Company Solves Difficult Problem of Handling Rock with Speed and Economy from Deepest Stripping Operation by Using Modern Quarry Shovel and Inclined Plane.*

By D. W. EVANS

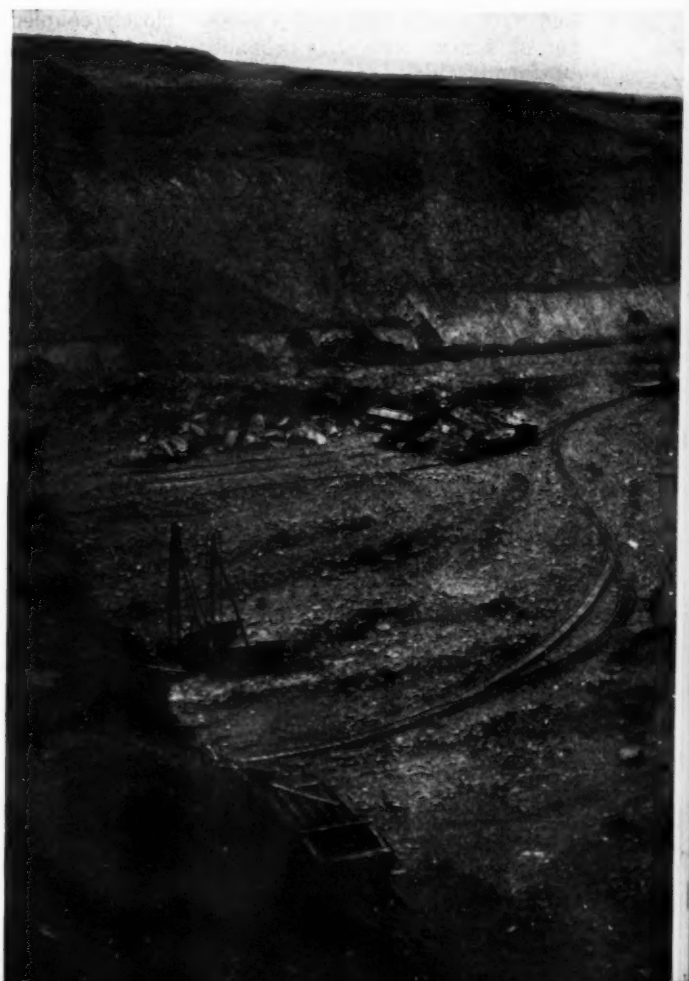
ON THE TOP of a hill near Audenried, Pennsylvania, stands a house enclosing a modern 600 H. P. Vulcan-GE electric hoist. More than a quarter of a mile away, and 350 feet below the hoist, is the bottom of a hole from which more than sixteen million yards of rock have been excavated. Here a modern Bucyrus-Erie electric quarry shovel bails more rock out of that hole at the rate of 35,000 yards a month. This deepest stripping operation in the anthracite coal field is probably the deepest coal stripping project in the world. The shovel stands on a bed of rock still 65 feet thick, and below that is the Mammoth vein of coal, nearly 100 feet thick at the bottom of the basin.

This job of A. E. Dick Contracting Company which is known as "Honeybrook No. 5," is in the Eastern Middle Field of the anthracite region, where coal lies mostly in steeply pitched basins.

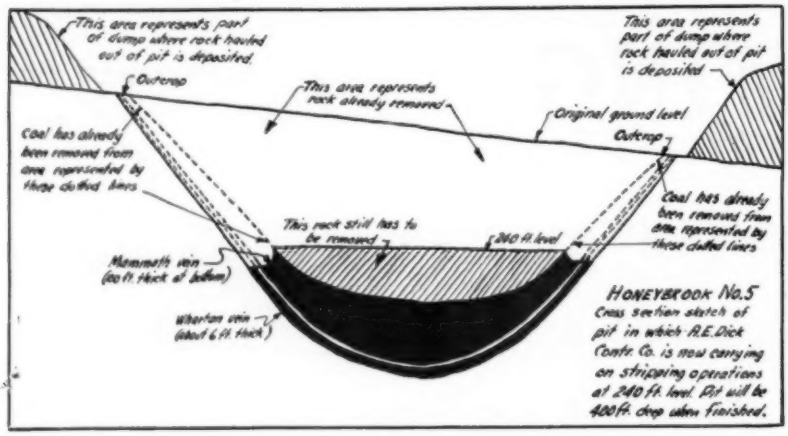
### Formation of Anthracite

All coal was formed ages ago from vegetable matter carbonized through the action of heat and pressure. Anthracite, which is hard and brittle, and contains almost no volatile matter, was subjected to the greatest pressure of any form of coal. While the initial pressure came from great layers of overlying sediment, the great pressure resulting in the formation of anthracite resulted from geological disturbances creating the folds now forming the hills and mountains of Northeastern Pennsylvania. These disturbances turned the original layers of sediment into rock, and left the beds of anthracite in steeply pitched, distinctly separated beds, now known as basins.

The area of workable beds of anthracite in Pennsylvania is only 484 square miles in extent, divided geographically into four distinct, canoe-shaped fields, all having their greatest length in a northeasterly to a southwesterly direction. The beds of the Northern, or Wyoming Field are comparatively flat, while the Eastern Middle and Western Middle Fields contain both flat and steeply pitching beds.



*General view of Honeybrook No. 5 pit showing Bucyrus-Erie 120-B electric shovel loading into 13-yard Western air dumps hauled by 18-ton Vulcan saddleback locomotives. The second train can be seen at the right, and the track curves around to the left to the plane. Two Cyclone drills in foreground and, at right, track on which mine cars stand for the Bucyrus-Erie 42-B steamer to load coal.*


This area represents part of dump where rock hauled out of pit is deposited
Outcrop
This area represents rock already removed
Original ground level
This area represents part of dump where rock hauled out of pit is deposited
Outcrop
Coal has already been removed from area represented by these dotted lines
This rock still has to be removed
240 ft. level
Coal has already been removed from area represented by these dotted lines
Mammoth vein (60 ft. thick at bottom)
Wharton vein (about 6 ft. thick)
HONEYBROOK No. 5
Cross section sketch of pit in which R.E. Dick Contr. Co. is now carrying on stripping operations at 240 ft. level. Pit will be 400 ft. deep when finished.

*Cross section sketch of pit.*

In the Southern, or Schuylkill Field, the coal beds lie almost entirely in very deep basins and at steeply pitching angles.

### Formation of the Honeybrook Pit

The "Honeybrook No. 5" pit is typical of the steeply pitched beds of the Eastern Middle Field. The coal here, as illustrated by the cross section sketch, ages ago lay in a flat, roughly rectangular bed half a mile long and a quarter of a mile wide and probably uniformly thick. Some upheaval depressed the middle of the bed so that now it lies in a great V-shaped trough, 400 feet high and 2000 feet long, the tips of the V a thousand feet apart. Thickness of the coal, as shown by the sketch, increases from nothing at the top to 100 feet at the bottom.

In order to reach the coal, it is necessary to remove the rock which lies within this V-shaped trough. Stripping of the outcrops started at Honeybrook in 1887, equipment consisting of picks and shovels, and wagons drawn by mules. Operations here have been going on for so long nobody knows exactly how many shovels have worn out bucking this rock, as hard a rock as is found anywhere in the anthracite region. Layer after layer of rock has been removed until the pit is now 240 feet deep, with nearly vertical north and south walls, 2000 feet apart. The walls on the east and west sides are of smooth rock 1000 feet apart at ground level sloping towards each other at a 50-degree angle. Against these walls coal long since removed once lay.

### Anthracite Stripping Similar to Quarry Operation

The fact that anthracite coal lies mostly in steeply pitched basins, and the further fact that this coal is buried under rock, dictate the methods of stripping. Operations are closely similar to typical quarry operation, consisting in blasting rock by dynamite loaded in well drill holes, and loading this rock with rugged, closely coupled quarry shovels into big, sturdy cars which are hauled away to the nearest convenient spot where the rock may be dumped without interfering with subsequent stripping operations.

### Charles Dick Pioneered Anthracite Stripping

The Glen Alden Coal Company, one of the largest producers of anthracite coal, is the owner of the Honeybrook pit. This company has for years directed the removal of millions of tons of rock from the pit, and in October, 1931, awarded the present contract to A. E. Dick Contracting Company of Hazelton, Pennsylvania.

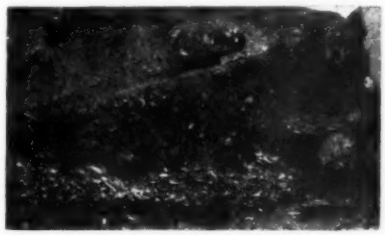
This company, as well as Dick Construction Company and Dick-Smith Engineering Corporation, is directed by A. E. Dick, one of the dominant figures in the field of anthracite stripping. Mr. Dick's father, Charles Dick, was a pioneer stripping contractor and "A. E." was brought up in the game, taking his first lessons as a lad on his father's knee. In turn A. E. Dick's son is following in his father's and grandfather's footsteps and promises to be another great leader in the stripping industry.

The Dicks have pioneered new stripping methods for upwards of fifty years, they have seen the railroad-type shovel replace hand methods, to be in turn made obsolete by the modern full-revolving quarry shovel. A. E. Dick, though an old timer in the game, uses and believes in modern methods. He keeps abreast of the newest methods of drilling and blasting and digging and hauling. Every Dick job gives the same impression of efficiency, of rapid removal of rock at a rate as constant as a factory schedule.

The Dick organizations at the present time have twelve separate jobs under way, the majority being stripping jobs and the

*The 120-B loading "nigger-bottom rock" on the floor of the pit, 240 feet below ground level. Standing in front of the shovel are Stanley Wagoner, oiler and electrician, and William Shumacher, pit foreman.*

balance "bank jobs." These latter involve loading of old refuse or culm banks to be put through the modern breaker. In the old days, before preparation appliances had been developed to the present state of efficiency, much good coal was deposited on the refuse banks with the impurities. Mr. Dick has bank jobs at Girardsville, Shenandoah, Wilkes-



*A loaded car weighing 50 tons being pulled up the 18 degree plane by the 600 H. P. Hoist.*

Barre and Excelsior. Four of his stripping jobs are under way within a mile or two of the Honeybrook job, which is described herein, and other stripping operations are carried on near Wilkes-Barre.

### Plan Solves Difficult Hauling Problem

General Superintendent Edw. C. Schwartz, who has charge of the stripping at Honeybrook No. 5 for the A. E. Dick Contracting Company, says the real problem on this job was hauling. On a typical job of anthracite stripping, the maximum depth reached is seldom as much as 100 feet. On such jobs locomotive haulage is almost universally used. However, he says, the practical limit on grade out of the pit is not much over 3%. Such a grade is not difficult to put in on most jobs, but the hauling problem was very different in the Honeybrook pit. A 3% grade from the present 240 foot level would be 8,000 feet long—more than a mile and a half. And several units of heavy equipment would be required to haul up this grade all the rock a modern 4-yard quarry shovel could load.

A practical solution of this problem was the construction of an inclined plane to haul loaded cars from pit to ground level. This has proved a quick and economical method, as smaller hauling equipment is required in the pit and on the road to the dump, and delays for cars at the shovel are practically eliminated. At the start of the job this plane was constructed on an 18-degree slope at the southeast corner of the pit. At the top of the slope the hoist house was built, and a Vulcan single drum hoist, driven by a 600 H. P. General Electric induction motor was installed. The drum carries 1600 feet of 1½-inch Roebling wire rope, which just reaches to the bottom of the plane.

### 4-Yard Shovel Descends 18-Degree Slope Under Own Power

Next on the job was the Bucyrus-Erie 120-B which was brought down the plane fully assembled under its own power. Erector Stevens didn't like taking such liberties with a brand new shovel, so to be on the safe side, the cable from the hoist was hitched to the shovel. But use of this safety device wasn't necessary, as the shovel eased itself down that 18-degree slope without difficulty.

*The new 120-B starts down the incline. The tremendous size of the pit can be judged by the size of the coal tipple shown across the pit.*

### Tripod Drill Holes Used to Improve Shooting

William Shumacher, foreman at Honeybrook, is trying out a new wrinkle on the drilling. The shovel will dig the rock even if it isn't so well shot, but good shooting is essential for large yardage output. Difficulty exists in the fact the rock lies in irregular strata and varies in character from a soft sandstone shale

*The Chicago-Pneumatic tripod drill putting down 2½-inch holes. In the background are the two well drills.*

to a hard blue black rock called locally "nigger-bottom rock" which might be serpentine. Drilling is mostly done by two Sanderson Cyclone electric well drills, using 6-inch bits. These drills put down 18 to 20-foot holes on 9-foot centers. Sometimes a hole is put down in 3 hours; sometimes they get only 10 feet in a shift, depending on the rock. They usually change bits 8 times for a 20-foot hole. Each hole is sprung with a box or 1½ boxes of 40% dynamite. The bottom is loaded with Hercomite and then the holes are carefully deck loaded with 4½-inch by 16-inch cartridges of 40% quarry gelatin, with spacing of dirt where soft rock or seams occur. Usually

*Glen Alden Coal Company uses a 42-B steamer for loading out the coal uncovered.*

about 4 tons of dynamite are set off at one blast. Bill Shumacher's new wrinkle is a series of 2½-inch holes put down between the well drill holes on 4½-foot centers by a Chicago-Pneumatic tripod drill, air-operated, using 1¼-inch steel. These are loaded with 40% dynamite, without springing, and set off at the same time as the well drill holes. It sounds like a good idea, and if the expected shattering occurs, the 120-B is going to be in easy digging—for rock.

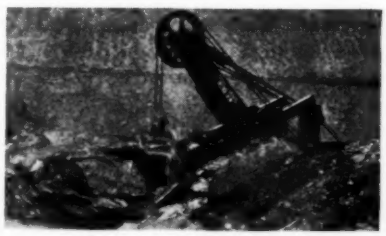
On this job, and on all Dick's jobs, Cordeau is used exclusively for setting off the dynamite. A length of Cordeau is inserted in each hole before loading, leaving a few feet sticking out of the top of the hole. Each length is spliced to the Cordeau header, and a single blasting cap on this header sets off the whole blast.

Over in the middle of the big Honeybrook No. 5 Pit, Pat Cortez at the levers of the big Bucyrus-Erie 120-B shovel is loading out the last few thousand yards of the "island" of rock which was in the bottom at the start of the present job. This will leave the pit level except for two troughs against the foot of the two sloping walls where the Glen Alden Coal Company has taken out the coal exposed by removal of the last layer of rock. The 120-B works in a 12 to 18-foot bank of rock, loading into two-car trains of 13-yard Western air dumps hauled by 18-ton Vulcan saddle-back locomotives. Bill Shumacher, the foreman, ran the shovel the first six months it was on the job. He says they haven't had any repair work to speak of yet — "the shovel is practically new, having moved only a half million yards of rock."

### Hoist Hauls Cars Up 1300-Foot Incline in 70 Seconds

A narrow gauge track is laid from the shovel to the foot of the incline, and the two Vulcans run loaded cars from the shovel and leave them to be hauled up the plane. Willard Lazarus, who runs the hoist at the top of the hill, can't see the cars at the foot of the incline. A bell lets him know when a loaded car has been hitched to his cable, and he throws the lever into the first notch as the big 600 H. P. motor takes hold of the load. Another notch, and the time delay relays start cutting out resistances. There are eight of them, and the last six cut out like a machine gun. The red hand on a big dial over Bill Lazarus' head shows where the car is—nearly at the powder house — then past it — then the car appears over the rim of the pit. A few hundred feet further, and he reverses the hoist, lets the car run out on the track to the dump. Our watch tells us that it took just 70 seconds to pull that car up 1,300 feet of the plane, to raise it 300 feet from the floor of the pit. Bill says the loaded car weighs close to 50 tons. Another of the 18-ton Vulcans couples on the car, and snorts up the grade to the dump. An empty is hitched to the cable on the hoist and the hoist operator starts it down to the pit. It disappears over the rim, and the big red hand swings steadily round to "BOTTOM." The operator shuts off the power until the bell rings, and then he starts another loaded car up the plane. Seventy seconds again. He pulls up about 100 cars every day, and lets as many empties down into the pit.

The hoist is well protected against accident. An overload switch kicks out if too big a load is pulled, and this automatically engages the brake whenever power is shut off. The hoist runs under governor control, so that it hoists and lowers always at the same speed—70 seconds per trip. The big dial that shows where the car is, is run by a chain from the governor shaft. Everyone connected with the haulage end of this job keeps a close watch on the 1½-inch cable and the chains and clevis to which the cars are fastened. The first cable lasted a year — it was replaced before it broke. The present cable is 1600 feet long, and the next one, wound on a reel outside the hoist house, is 100 feet longer, because by the time that goes on, the 120-B will be well along with another 18-foot level of rock, so the pit will be that much deeper. They never had an accident with the hoist except at the very start of the job, pulling two cars up the plane. The overload switch kicked out and set the brake, but the momentum carried the two cars up the slope a few feet, and the cable snapped as they ran back. They had just started, so the damage as they piled up on the bottom was not serious.



*A close-up of the 120-B pulling out a big one.*

(Continued on page 357)

# MOVING TWO CREEKS to permit expansion of Dolonah Quarry

***Tennessee Coal, Iron and Railroad Company Relocates Channels Through Concrete Lined Canals***

READERS of **Excavating Engineer** will doubtless recall description of drainage improvement work, described in the March 1932 issue, on Valley Creek undertaken by the City of Birmingham, Alabama. The present article deals with another more elaborate improvement on this same stream about ten miles further down, below Bessemer, Alabama.

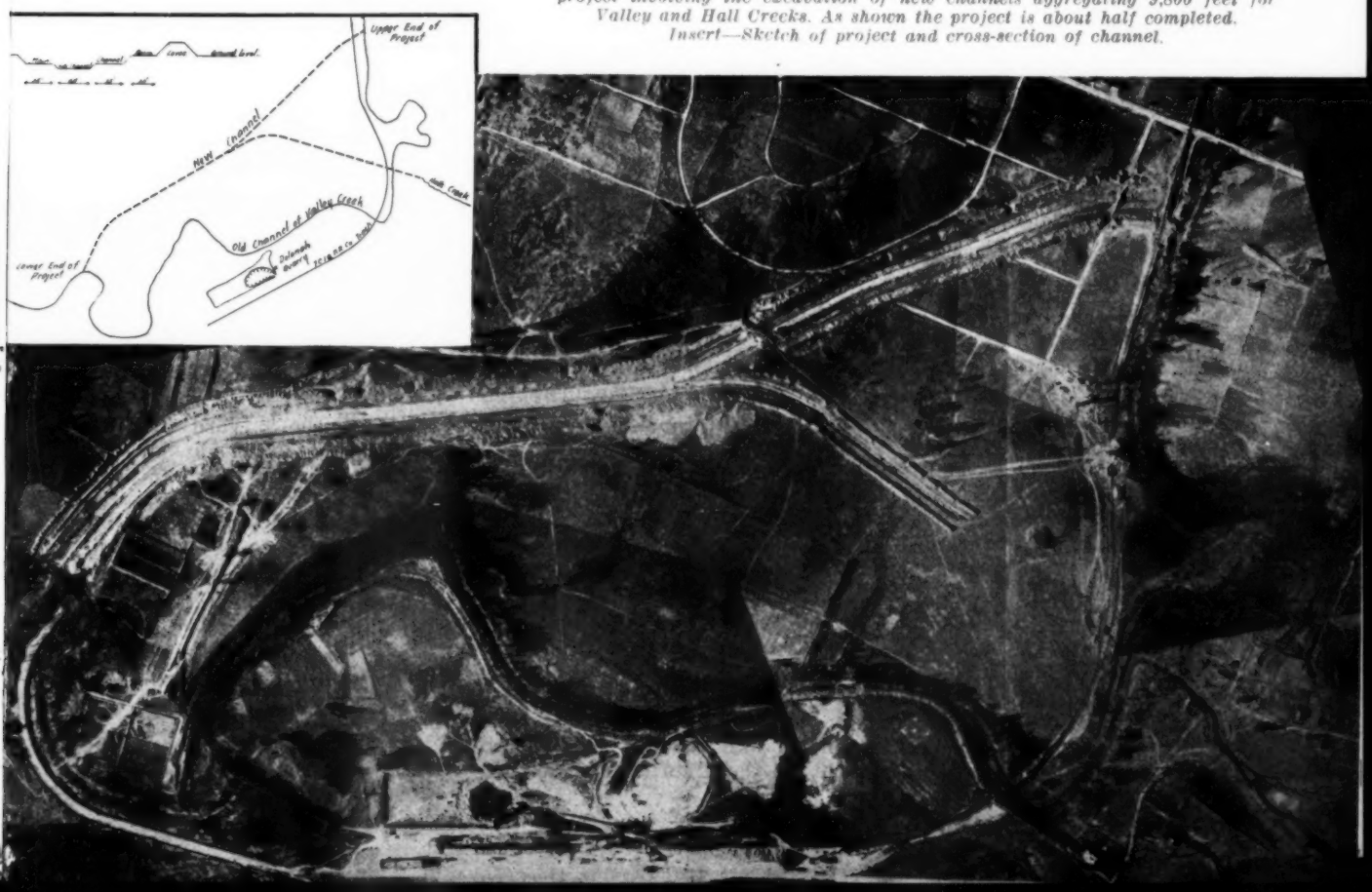
In order to provide additional area for future expansion of its Dolonah Quarry near Bessemer, the Tennessee Coal, Iron & Railroad Company of Birmingham, Alabama, a subsidiary of the United States Steel Corporation, decided to relocate the channel of Valley Creek and its branch, Hall's Creek, which flowed nearby. This project was under the general supervision of the Raw Materials Division of the Tennessee Coal, Iron & Railroad Company.

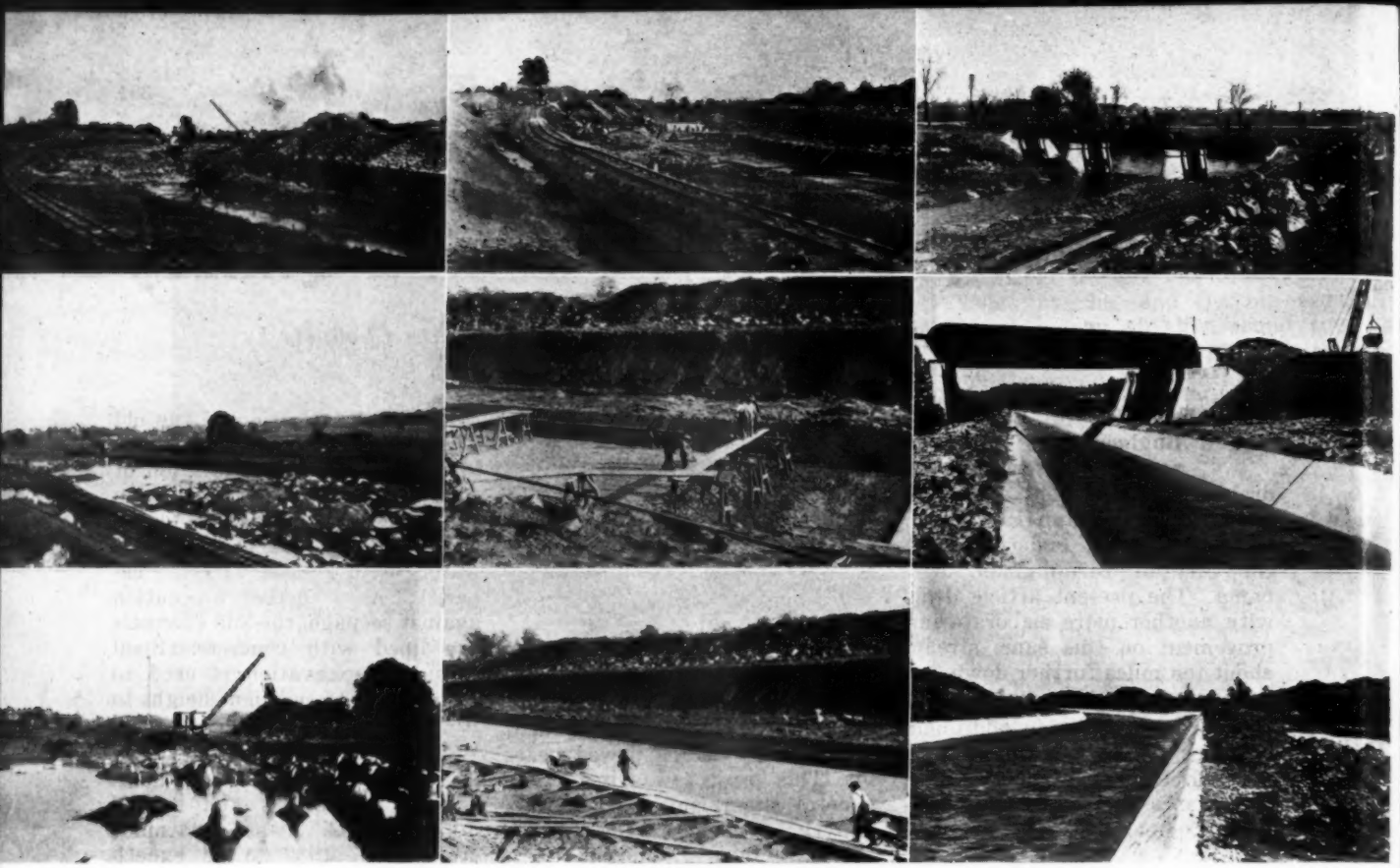
*Two-yard dragline filling in portion of abandoned channel of Valley Creek.*

A glance at the sketch below will show the location of the old Valley creek channel with its devious course, also the location of the new channel. It can be seen that the new location provides a much shorter course for flood waters with greater carrying capacity. As a further precaution against seepage, the sub channels are lined with concrete. Spoil from the excavation is used to form levees of sufficient height to prevent any possibility of flood water reaching the quarry.

Bids were received from a number of contractors and opened July 18, 1932. Award was made August 31, 1932 to an experienced local contractor. Approximate quantities involved in this

*Airplane view of the Tennessee Coal, Iron and Railroad Company's relocation project involving the excavation of new channels aggregating 9,800 feet for Valley and Hall Creeks. As shown the project is about half completed. Insert—Sketch of project and cross-section of channel.*





*Left: Top—The excavation of the sub-channel progresses through solid rock. Note the shovel and dragline teaming up to eliminate rehandling. Middle—section of channel with clay removed by dragline. Bottom—Close-up of irregular surface of limestone showing what made the excavation of the clay a tough job. Center: Top—Concreting in progress in the new channel. Middle—Showing the method of placing the concrete. Bottom—Sub-channel concrete bottom in place; sides not poured. Right: Top—Upper end of the diversion channel. Middle—Completed section on Hall's Creek Channel. Bottom—Looking upstream along new channel showing junction of Valley and Hall Creeks.*

undertaking are as follows:

300,000 cu. yds. common excavation

60,000 cu. yds. rock excavation

1,200 cu. yds. concrete (piers and abutments of two bridges)

31,000 sq. yds. concrete channel lining

26,000 cu. yds. protection levee, lower end

3,500 cu. yds. protection levee, upper end.

The new channel of Valley Creek is about 6,300 feet long or less than half the distance of the old creek bed between junction points of the new channel. The grade is 0.24 per cent or a drop of approximately 14 feet. The new channel of Hall's Creek is about 3,500 feet long with a grade of 0.12 per cent or a drop of approximately 4 feet. The maximum depth of excavation was about 21 feet near Station 49 in the main channel. Both the Valley and Hall's creek channels have a sub channel to handle normal flow and a much larger main channel at higher elevation to handle floods. There is shown a cross-section of the channel on the sketch. The bottom width of sub channel on Valley Creek is 40 feet and on Hall's Creek 10 feet.

### One shovel and two draglines handle job

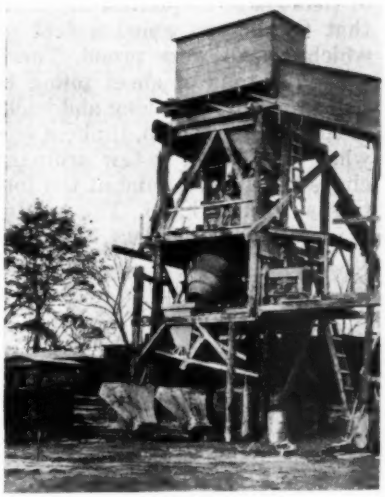
Promptly after securing award the contractor began installing equipment on the job. As progress depended first on excavation, a 1¼ yard steam shovel and a 1½ yard gasoline dragline were placed on September 3. Shortly after a 2 yard gasoline dragline was installed. The draglines began at the lower end of the project casting material to each side of the channel and stripping down to rock so as to permit drilling and blasting operations to begin as soon as possible. The steam shovel started into the deepest cut on the main channel loading material into trucks in which it was hauled and placed in the protection levee across the old creek channel at the lower end of the project. As the excavation progressed the steam shovel was placed in the bottom of the sub channel which consisted almost entirely of rock. In this position the shovel loaded rock into the bucket of the 2 yard dragline which stood alongside on the ground surface or berm. In spite of the need of coordinating the operation of the two machines a fair rate of progress was maintained, and the dragline was able to place material in the levee without rehandling.

### Drilling and shooting handled by sub-contractor

Drilling and shooting of the rock excavation was sublet to a

local firm experienced in this class of work.

The drilling and blasting contract was serviced by an electrical compressor installation consisting of two compressors, one 310 cubic foot displacement and the other 375 cubic foot. Power for the central compressor plant was furnished by the Tennessee Coal, Iron & Railroad Company and supplied by a transmission line 2,600 feet long from the Tennessee Company substation at the quarry. This 2,300 volt transmission line as well as electric light line throughout the length of the job was built by the contractor. From the central compressor plant a 4 inch air line was laid parallel to the canal. The drilling and blasting contractor operated from four to eight drills in from one to two shifts, depending on the requirements of the general contractor. The drilling was started after the earth was stripped from the rock and after primary drilling had been finished for a given distance. These holes were loaded and blasted with electric blasting caps. All large boulders were then drilled and blasted with fuse and caps. After the broken rock was removed from the channel by the draglines and steam shovel any high points were drilled and blasted by the secondary drills.



*Central concrete mixing plant.*

The rock encountered on the first 2,400 feet on the main channel was a hard limestone. On the Hall Creek branch and the balance of the main channel the rock encountered was a dolomite.

### Central mixing plant speeds up operations

In order to handle the concrete work in the bridges and lining of the channels a central mixing plant was installed alongside the T. C. I. R. R. tracks. Aggregates were unloaded by a 10-ton steam-operated stiff-leg derrick with clamshell bucket so arranged to deliver material to the bins or to stock pile.

A 1-yard tilting type mixer with water measuring and time control device was used. Cement was handled from the storage house by belt conveyor. A batch weigher insured uniform proportion of aggregates and cement. For distributing the concrete to various points a 24 inch gauge industrial haul system with six 1-yard concrete cars and two gasoline 3-ton locomotives were used.

At the point where pouring was in operation, the concrete cars discharged into a receiving hopper alongside the track. This hopper was mounted on wheels, see photo, to allow quick moving and held enough material to serve the concrete buggies between trains. In the channel lining a slag sub base was laid before placing the concrete. For the slopes portable steel forms were used.

### Quick work in spite of bad weather

During the early Fall months with favorable weather conditions, excellent progress was made. Excessive rains began in November and practically no work was done from December 9th to January 4th. Strange as it may seem, January proved to be a good month for concrete work, and about 2,000 feet of channel lining was placed. In spite of bad weather during February, the contract was practically completed by the middle of March. Water was turned into the Valley Creek channel about the middle of February and into the Hall's Creek channel about March 15th. At the time work was begun it was expected that diversion of Valley Creek would be made by February 1st. In view of the unusually unfavorable weather conditions under which this work has been done, the progress made by the contractor is quite remarkable and much credit is due to the members of his organization.

*Concrete receiving hopper mounted on wheels to permit ease in moving.*

*Steam shovel in bottom of channel passing material to 2-yard dragline.*

*Pulling piles at Esquimalt*

# A Dragline Adventures out to Sea

***How Northwest Dredging Company's Bucyrus-Erie Class 24 ventured out to new experiences on the Gulf of Georgia.***

BY J. A. MacKENZIE

IN LOOKING over the latest copy of Excavating Engineer it occurred to me that the intimate life history of an old Bucyrus-Erie dragline that recently stepped out to a career on the high seas should make interesting reading for any construction man or engineer. Like any important construction tool this dragline had its joys and sorrows —responds to good treatment, and howls and groans when abused.

The machine was an old steamer on skids and rollers built by the Bucyrus-Erie organization a good many years ago. Its experiences by land were of the usual variety I imagine because, after all, it takes the sea to give a real thrill to any adventure. What must have been the feelings then of this former land lubber when he was placed on a deck scow and began to lead a seafaring life? He didn't exactly fit in because the scow was too high. What queer sensations he must have had having to work with a clamshell or an orange peel bucket! How often did the fear of overturning into the cold water send shudders through his frame? He even had to cross the Gulf of Georgia on the end of a tow line. I imagine this trip of 80 miles from Vancouver to Esquimalt was one of the high lights of his whole career for his useful life almost came to an untimely end when a sudden storm broke during the voyage. Waves broke across the deck, wild wind whistled through his rigging, the tow rope strained to the breaking point, but regardless of his inward feelings old Cyrus gravely held his place and showed no signs of panic.

I am quite sure that he would not have suffered so many qualms during this part of his career if he had had a closer acquaintanceship with his runners. For Operators Jack Bruce, Al Nordstrum (poor chap passed on last year), and Dick Disney, as well as Manager G. T. Baird, Dredge Superintendent, and all the boys of the Northwestern Dredging Company had plenty of experience on the water and Cyrus was safer than he knew. In fact the seafaring friends were so much kinder than those on land, that during his whole career as a mariner he never once had to scream for oil or grease. You know some of those land operators are careless boys but the careless ones around the salt chuck get drowned before they get to the lever house.

It was after crossing the Gulf of Georgia to Esquimalt dry dock that Cyrus performed a feat of which we all were proud. There were 700 tons of sheet piling to pull . . . eighty feet long and backfilled with rock, mud, timbers and what not. After a few ordinary chaps had tried a hand at the job, Cyrus took a hand. The photo-

(Continued on page 384)

*Northwest Dredging Company, Ltd., of Vancouver, B. C., mounted this dragline on a scow and found it very useful in connection with their dredging operations.*

# SELECTIVE SHOVELING at the PORT of CALLAO

***Sverre A. Wee, Mining Engineer, who had charge of quarry operation, gives additional details regarding this interesting job handled by Frederick Snare Corporation.***

IN THE MARCH issue of Excavating Engineer there appeared a very complete article on Frederick Snare Corporation's operations at the Port of Callao in Peru. One of our readers in England wrote us requesting additional information particularly regarding the problem of use and loading of classified rock sizes for the breakwaters.

This letter was referred to the author, Mining Engineer Sverre A. Wee, who is now in charge of a quarry operation in Norway.

Mr. Wee's reply follows:

### Selective Shoveling

Some time or another a construction firm, in the nature of the work it handles, will be called upon to produce graded material or do selective shoveling. I believe this is done oftener than the makers of the shovels realize, but I hardly think they are able to help us materially by differing the general design of their units. There are therefore then left us only two other means to accomplish this. And they are: The blasting of the rock, and the man behind the levers.

Regarding the first may be said that, when given time to study his hill and select his method of blasting and kind of explosive, an experienced blaster will materially help to bring about the desired results, i. e. a certain grade of rock. By varying his charges, the distance between them and to the toe, and by straight or buffer blasting he has several means in his hands that, to a certain degree, enable him to control the size of the material blasted or to be blasted. If this is done the task of the shovel- runner is considerably eased. On the other hand it may at times occur that the stratification, the bedding and fault systems in the hill

*Several 70-ton Magor dump cars loaded with oversize rock, each weighing from 11,000 to 33,000 pounds. Over 4,000 loads like these went into the breakwaters.*

may be such as to prohibit or make it difficult to attain by blasting any special kind of grading, and the job is then entirely left to the runner. But in general the practise must be to cooperate blasting and digging.

As you were aware, the Snare Corporation was confronted with the task of selective shoveling at their quarry at Callao, Peru. In fact we were several times faced with the problem, and had to produce with no or short notice graded rock for special purposes. But the job we had to face practically from the beginning of the quarry, was to produce oversizes, rock for shouldering or surfacing the breakwaters.

### Three miles of breakwater to rip-rap

The contract here called for the laying of rock of 5 to 15 (long) tons weight in the entire length (3 miles) of the breakwaters, which had a general width of 7 meters (23 feet). It was at first thought that we would have to secure this quantity of boulders from a special quarry, and a study of costs, transportation facilities, etc., from a foreign quarry was made. However, the matter was left unsettled, and by varying our blasting we found eventually that we could produce the oversizes ourselves. When this was decided a strict order forbidding the blasting of any oversize rock was issued. And we succeded in accumulating the amount needed for shouldering the entire length of the breakwaters, by simply shoveling them out of the ordinary blasts and saving them.

### 3-yard shovels handle rock weighing 25 long tons

In this way I have seen our 100-B steam shovels handle rock up to 25 tons, get hold of them generally by pushing them up against the muck-pile, get them to sit on the bucket teeth and generally lay against the yoke or the rope (hoist-rope), lift them and place them on the other side of the track without changing position. It was not done only once, but it was an every day feature. Before the breakwaters grew to their final heights above sea level, all oversize rock was in this way placed on the opposite side of the track, stacked for later loading.

*Note oversize sorted out by the Bucyrus-Erie 100-B's for later loading when these larger sizes were required. The actual size of the rock may be judged by comparison with height of man in foreground just to right of center.*

**14-minutes only required to load 70-ton car with selected large rock**

After the dumping of oversize could start, these were loaded directly on to special big-rock cars and hauled away with the ordinary run. The special big rock cars were nothing else but our ordinary 70-ton Magor-built side-hinged apron cars with one side lifted out. That these cars were eventually badly damaged was nothing more than expected. Often the boulder was so big that the only way to get hold of it was to jam it between the teeth and the bail and hold it there in a scissor like manner. And in placing them on the flat cars many intricate situations derived. But as a whole our runners, though all Spaniards and Peruvians, soon learned to load these cars and prepare the rock for them, so that we later, as a general rule, could figure it would take us only twice as long to load these open rock-cars as an ordinary closed car with smaller rock. Our average figure for loading an ordinary car was 7 minutes.

**Crane for rock handling found unnecessary**

Being inexperienced with this kind of loading we had bought a standard type Koehring Crane to handle the oversizes. It was also sent to the quarry, but was found useful for other purposes and after having loaded some few cars never more was called upon to load rock. All loading was done by the 100-B shovels, and you may figure we sent about 4000 cars of oversize to the breakwaters.

We seldom used wire slings around the boulders. Slings were used but generally only to haul them close enough for the shovel to get hold of them. Slings will often break, causing in that way damage to pipelines, airlines, etc., when the rock falls. And they are often difficult to get loose on the cars. The sidestrain you then must put on the dipper sticks to haul the cable free is probably more damaging to the shovel front end than anything else.

As you probably will realize from the above our system worked out very well. It formed an integral part of the loading operations and we hardly noticed any ill-effects. Our shovels stood up fine. The records for our hoist-ropes, teeth, buckets, dipper sticks were more or less standard, rather above than below, in spite of this strenuous service.

**Record output made in selective shoveling**

From one time to another we were also called upon to deliver special fines, i. e. rock not bigger than that one man could handle. Given a reasonable notice this is fairly easy to accomplish by special blasting. Strange as it may seem, it was during a period of selective shoveling for fines, that our Bucyrus-Erie shovel No. 14 set up the high record for shoveling in one month for the entire job. This individual record was 38,333 cubic yards.

If these few things I have here been able to describe from the harbor-job in Callao may be of any interest to you, I am indeed glad, and should there be any further point you would like to discuss, I am at your service. It is to me always a pleasure to remember the work the Bucyrus-Erie shovels did for us and I realized then what an old time shovel runner meant when he said: "You must make the shovel sing."

*The experienced blaster has several methods at his command which will enable him to control the size of material blasted. Without the help of any crane or rope sling, the 100-B's on this job placed rock as large as 25 tons on the other side of the loading track where it was later loaded by the same machines as needed.*

* * *

The above information from Mr. Wee will no doubt be of interest to many of our readers. On behalf of these, our inquirer, and ourselves we thank Mr. Wee for his description of methods used in handling classified stone.

## Plan for Winter Operation

THE PUBLIC WORKS program now under way is designed to put men back to work. To be of material benefit it must keep them there until private construction and general industry is in a position to absorb the surplus.

That means that the construction industry must plan for practically continuous operation through the winter months in order to do its part in President Roosevelt's plan.

And why not? Even in severe winters there are few days when work cannot be carried on on most operations as successfully as in summer. Men work better and at a brisker pace in winter than in summer. Rock excavation is just as easy to do. If four 6-hour shifts or three 8-hour shifts are worked to prevent the frost from setting into the deep cuts, common can be moved as easily even in the freezing weather of the northern states. Shallow cuts in material which freezes too hard for fast digging with a shovel can be handled this fall or next spring leaving the more easily handled deep cuts for moving during cold weather.

Basement excavation can be carried on without serious difficulty in cold weather. Where blasting of frost is necessary this can be done at a reasonable expense. Even concrete can be readily handled now-a-days without danger of freezing.

The new contracts let under the Public Works portion of the Industrial Recovery Act will call for completion dates that will handicap the contractor who figures on a winter shut-down. The administration expects each dollar spent to give maximum employment and the most permanent employment possible. To do this the winter slump in construction must be eliminated.

The construction industry can be counted on to do its part.

# HONEYBROOK — the deepest hard coal strip mine

(Continued from page 350)

Those connected with the Honeybrook job are satisfied that haulage by means of this inclined plane has justified itself. The plane makes it possible to do all hauling—except up the incline—with four 18-ton dinkies. If that mile and a half of track had been installed to permit locomotive haulage all the way up from the pit on a 3% grade, 50-ton locomotives would be required, at least four of them, and it would probably take all of ten minutes to haul a loaded train from shovel to dump.

### Plenty of Room Needed for Dumping

In the process of uncovering some 600,000 tons of the finest anthracite, it has been necessary to remove about sixteen million yards of rock from the Honeybrook pit. This rock has been dumped in deep piles which now surround the pit on three sides. One end of the pit, known as Honeybrook No. 10, has already had the coal removed, leaving a hole 360 feet deep which served as a dump for a couple of million yards of the rock. At the present time the loaded cars of rock brought up the plane by the hoist, are hauled by the 18-ton Vulcan saddle-back locomotives up a dump track laid on the hillside south of the hoist house. The rock is dumped in a layer about 40 feet deep, and the track is long enough so that it is seldom necessary to move it nearer the edge of the fill.

### Glen Alden Handles Coal Removal with 42-B

A. E. Dick Contracting Company is concerned only with the removal of the rock overburden in the Honeybrook pit. The Glen Alden Coal Company handles the coal uncovered by the 120-B. This coal is dug by a Bucyrus-Erie 42-B 1¼-yard steamer, and loaded into mine cars holding 5 tons each. From 75 to 100 cars a day are loaded by the 42-B and hauled up the plane to the colliery for preparation as the famous Glen Alden "Blue Coal."

There are actually ten veins of coal existing in the Middle Eastern Field, and traces of them all can be found in the Honeybrook pit. Most are too thin for economical mining so most of the coal comes from the Mammoth vein, but the Wharton vein which lies just below is also cleaned up by the 42-B.

### Producing "Blue Coal"

At the breaker or colliery, the coal passes over the "bull shakers" which are screens to remove pieces larger than "Grate" size. These larger pieces are conveyed to the main rolls where they are broken into Grate and smaller sizes. The material from the rolls, together with that of such a size that breaking was not necessary, passes over shaking screens under strong jets of water to separate the larger from the finest sizes. Through separate chutes the larger sizes pass to one cleaner and the smaller sizes to another. The cleaning process is based on the fact that rock, bone and slate are heavier than coal, so that by a flotation process the impurities sink and clean coal is obtained. This clean coal then slides along carefully graded chutes to shaking screens where any particles of adhering silt are removed under cascades of water. The screens segregate the various sizes which are conducted along separate chutes to the loading pockets at the bottom of the breaker from which they are loaded into the waiting railroad cars or trucks.

Only the large producers of anthracite, such as the Glen Alden Coal Company have the facilities to clean coal so that the ultimate consumer is assured of the highest grade fuel. In order that its customers could be sure they were obtaining genuine Glen Alden coal, this company conceived the idea of spraying a blue dye on their finished product. This method, by means of which it is assured that the best of anthracite can be identified, produces the famous Glen Alden "Blue Coal."

*A good idea of the digging encountered by the 120-B is given in this illustration.*

Returning again to the Honeybrook pit, we find that diagonally across the pit from the plane is the blacksmith shop, which also houses the two stage 15½ and 12½ by 19 Diesel driven Ingersoll-Rand air compressor. This compressor furnishes air for two drill sharpeners — one for well drill bits and one for jack-ham-

(Continued on page 384)

# EXCAVATING ENGINEER

FOUNDED 1908

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## The Business Situation

THE DANGER of centering one's attention too fixedly on one phase of a problem, even though that phase be important, is that a change in some entirely different phase will create a variation in the problem that may pass unnoticed at an important moment. The United States Government's activities for the past few weeks have played a tremendously important part in altering public sentiment, in changing a mass pessimism into a mass optimism.

In general, the National Recovery Act and its administration has been given complete popular credit for the decidedly better business conditions of today. The danger is that with this one factor occupying the limelight in so many minds, one minor, unfavorable move may undo much of the benefit that has already been gained. Other important and relatively unseen factors are improving both domestic business conditions and the conditions in foreign countries. As pointed out previously in these pages a number of other nations have been enjoying recovery for the last year and while, in no case the improvement has been abrupt, it has, in some cases, been more steady than the improvement in the United States.

We are apparently participating in a world-wide economic improvement. This improvement has developed through an improvement in sentiment among people the world-over and this improvement in sentiment will gradually lead to increased buying power, increasing speed, higher prices and some margin between the individual's income and his fixed expenditure due to debt and investment.

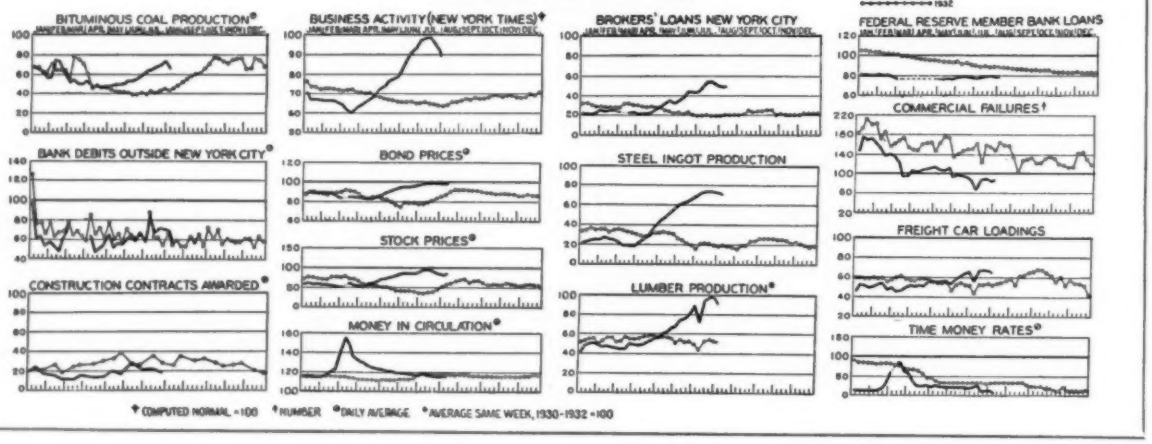
A domestic reaction, a sudden abrupt change in public opinion might make some temporary difficulty for us. The fact remains, however, that with much of our export difficulty better understood than it has been, and with every chance for its being rapidly straightened out, there is little possibility that any one commercial nation can change the international swing that has started or can long resist the natural tendency to follow.

The weekly business indicators reproduced below are as reassuring a set of charts as we have had the pleasure of publishing for some time. Money in circulation in the middle of August has dropped below that of a year ago, now about 115; lumber production reaches almost 100 after staying around 50 for almost a year and a half, stock prices have almost reached 100, have dropped back to 80 and are advancing; bituminous coal is above last year and stands at 65, having been up to 75 from a low of 40 last year; business activity up to 100 and back to 90 from a low of about 60 last March. And one of the most interesting of the group is the curve for time money rates.

Easy money means the availability of funds to carry out the new projects and business expansion dictated by the optimism that has been generated in our country during the last few weeks. An abrupt tightening of money rates at the present time might seriously retard the progress that is being made now. It is to be noted, however, that all indicators which reflect the availability of funds show improvement over the months gone by.

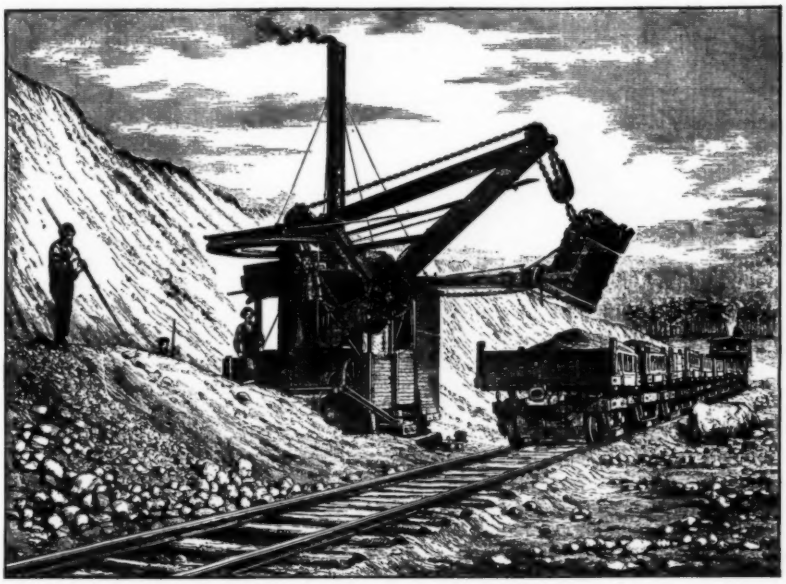
Worry should not be wasted on the temporary change in direction shown in the business activity chart. It should be remembered, that in the most orderly of advances from depression inactivity there is bound to be a certain amount of speculative activity which having spent itself retires from the picture and, having retired, leaves a more healthy condition.

## WEEKLY BUSINESS INDICATORS



# From a Dean of Old Timers

**Here's a letter from an Old Timer whose experience goes back close to the beginning of the power shovel. Our good friend N. C. McGinnis tells us about an old Souther back in 1876.**



*This isn't the job Old Timer McGinnis tells about but it's one of the old Souther shovels and just like the one Mr. McGinnis worked on back in 1876. The illustration is a reproduction of the picture on the cover of John Souther and Company's catalog issued about 1885 and is entitled "Hard Pan and Gravel Excavator." This old catalog was furnished through the courtesy of the McLanahan Stone Machine Company of Holliday, Pennsylvania.*

"THE OLD TIMERS' letters seem quite appropriate in these days when Mr. 'Dpresh has a strangle hold on nearly all things, even the Old Timers. Personally I get quite a 'kick' out of the experience of Mr. Sullivan, Kotitzky, Bodette, et-all.

"Without taking too much time in preliminaries I will give the 'low down' on some ancient dirt moving machines, and though it will not be 'new' to a few Old Timers, it will be new to most of the ones living at this time.

"I, a lad in short pants, was a member of a shovel crew on Moon Island, Boston Harbor (the project was the building of 'Outfall Reservoir' for sewerage for City of Boston). My father was general superintendent of construction. During vacation from school I was engaged as official 'shock absorber.' I raised up the shaft of the 'tip-carts' (as the ¾ shovel dumped its load into them) and placed a 2x4 stick under it to save the horse's back from the jar. Hence I was a full fledged member of the shovel crew. This was back in '76-'77 and you will have to admit it was quite awhile ago.

"I may not be the 'Dean' among shovel men, but I think I will run 1-2-3 in this capacity. As to the shovel, it was a ¾-yard 'Boston' shovel (built by the Souther Machine Company of Boston) single engine 'crane type,' pocket-sheave-crowd for 'dipper stick' craneman. The craneman, or dipper tender as he was called, used two levers, one for 'out' and one for 'in' motion. The upright boiler gave 15-20 H.P.; hoist drum was cast iron and lowered by steel band on face. White lead was the medium to save the brake band from cutting the disc face. A solid jaw clutch was the type used for engaging the drum to engine. (Quite a few stops to repair the same when too much speed was 'ON' when lever was pulled in). The frame of shovel was of plates bolted to wood, and the length of house was about 16 feet and width 8 feet. Fireman tended the fire from pit floor as no platform was provided. Casting of steel was not in general use, cast iron was used in gears, pinions, etc. Care had to be taken to keep things going with these parts as 'was.'

"Wm. Gray was the owner and was engaged to load carts at a per yard price. Angus McDonald was the 'dipper tender.' Mr. Gray, who operated the machine himself, was a rough talker and breaking Angus in was a worry to him. 'Up on your right,' 'Down on your left,' 'What the H---l are you gouging her in there for' was a frequent salutation. Angus lost his patience one day and stepped down on the ground, reached up and got Gray around the neck, pulled him out of his coop and, after mauling him plenty, both took their positions and digging went on as usual. Mr. Gray was a big man weighing about 200 pounds but Angus (Scotch Canadian) was U. S. Champion 'Caledonian Society Hammer Thrower' of the '80's and was a two-fisted blacksmith so that was that.

"Last heard of Mr. Gray was when he assembled five ¾-yard new design shovels (part friction) in St. Louis, Mo. All of these were used in Texas and vicinity. Mr. Gray died and his 'new' shovel development ended there in '79 to '80.

"The public works contractors or some of them who operated in the '70's and '80's were: N. C. Munson, Pat Kiernan, Mike Kiernan of Massachusetts, Hoblitzell, Stewart and Socier of New York. A Howell or Powell of Boston was general contractor on the Moon Island Project and a Mr. Stearns was the Chief or Consulting Engineer.

"During later vacations I was on railroad tunnel and water works (Boston to So. Framingham, Mass.); stone work (abutments, etc. from St. Johnsbury, Vt. to Lake Champaign, N. Y. and Plymouth, N. H. to Woodstock); on branch line railroad (Fabyn House to Profile House, N. H.). Next I took a western journey from 'Beantown' to Momence, Illinois, building the 'Three Eye' railroad (McGillis and Hogan Contractors). Father was the General Superintendent of Construction of this line in '81 and '82. Slip scrapers, dump board wagons, picks and shovels were the implements used. The 'trap,' wheeler-fresno or grader was not yet in use.

Diggingly yours
(Charlie Mack)
N. C. McGinnis"

Thank you, Mr. McGinnis. Come again.

# Bureau of Roads 1932 Reports on State Highway Systems

## State Highway Construction During 1932 Year

| STATE (YEAR ENDS DECEMBER 31, 1932 EXCEPT AS NOTED) | TOTAL MILEAGE IMPROVED AND SURFACED | EARTH & ROADS IMPROVED (GRADED AND DRAINED) | NEW SURFACING PLACED | | | | | | SAND-CLAY AND TOPSOIL ON | | | GRAVEL, GRAVEL, ETC. (TREATED & UNTREATED) ON | | | WATERBOUND MACADAM (TREATED & UNTREATED) ON | | | BITUMINOUS MACADAM BY PENETRATION ON | | | BITUMINOUS CONCRETE (INCLUDING SHEET ASPHALT) ON | | | PORTLAND CEMENT CONCRETE ON | | | BRICK PAVEMENT VITRIFIED BRICK ON | | | STATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TOTAL | SUB-TOTAL LOW TYPE | SUB-TOTAL HIGH TYPE | ON EARTH ROADS | ON OLD SURFACE OTHER TYPES | ON OLD SURFACE OF SAME TYPE (RECONSTRUCTION) | NON-SURFACED | OTHER TYPES | SAME TYPE | NON-SURFACED | OTHER TYPES | SAME TYPE | NON-SURFACED | OTHER TYPES | SAME TYPE | NON-SURFACED | OTHER TYPES | SAME TYPE | NON-SURFACED | OTHER TYPES | SAME TYPE | NON-SURFACED | OTHER TYPES | SAME TYPE | NON-SURFACED | OTHER TYPES | SAME TYPE | |
| ALABAMA 1/ | 295 | 107 | 144 | 139 | 10 | 113 | - | 36 | 6 | - | 35 | 42 | - | 1 | - | - | - | - | - | - | - | - | - | 10 | - | - | - | - | - | ALABAMA |
| ARIZONA | 120 | 4 | 116 | 109 | 7 | 110 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 3 | 3 | - | - | - | - | - | - | ARIZONA |
| ARKANSAS | 14 | 9 | 5 | 5 | - | 5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | ARKANSAS |
| CALIFORNIA | 1,411 | 64 | 1,347 | 1,164 | 183 | 1,145 | 169 | 117 | - | - | - | 85 | 68 | 27 | - | - | - | - | - | - | - | 20 | - | 40 | 17 | 20 | - | - | - | CALIFORNIA |
| COLORADO | 642 | 5 | 637 | 637 | - | 637 | - | - | - | - | - | 51 | - | 398 | - | - | - | - | - | - | - | 1 | - | - | 17 | 2 | - | - | - | COLORADO |
| CONNECTICUT | 69 | - | 69 | 56 | 13 | 56 | 13 | - | - | - | - | 2 | - | - | - | - | - | - | - | - | 1 | - | 1 | 3 | 11 | - | - | - | - | CONNECTICUT |
| DELAWARE | 56 | - | 56 | 27 | 29 | 27 | 29 | - | - | - | - | 27 | - | - | - | - | - | - | - | - | - | - | - | 23 | - | - | - | - | - | DELAWARE |
| FLORIDA | 130 | 28 | 102 | 79 | 23 | 79 | 23 | - | - | - | - | - | - | - | - | - | - | 16 | - | - | 24 | 3 | - | 7 | - | - | - | - | - | FLORIDA |
| GEORGIA 2/ | 1,189 | 242 | 947 | 459 | 488 | 396 | 273 | 82 | 85 | - | 41 | 76 | 35 | 11 | 173 | 60 | 2 | 25 | 14 | 6 | 9 | 46 | 2 | 158 | 130 | 2 | 3 | - | - | GEORGIA |
| IDAHO | 773 | 6 | 767 | 283 | 484 | 125 | 20 | 138 | - | - | - | 185 | 2 | 139 | - | - | - | - | 4 | - | - | 4 | - | - | - | - | - | - | - | IDAHO |
| ILLINOIS | 852 | 183 | 669 | 4 | 665 | 662 | 6 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 638 | 9 | 1 | - | 32 | - | ILLINOIS |
| INDIANA | 623 | 6 | 617 | 4 | 613 | 159 | 454 | 1 | - | - | - | 6 | 2 | 16 | 15 | - | - | 23 | 41 | - | 3 | - | - | 57 | 353 | 8 | - | 3 | - | INDIANA |
| IOWA | 79 | - | 79 | - | 79 | - | 79 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 14 | 64 | 1 | - | - | - | IOWA |
| KANSAS | 1,158 | 186 | 972 | 880 | 92 | 864 | 2 | 2 | 257 | - | - | 172 | 438 | - | - | - | - | - | - | - | - | - | - | 77 | 26 | 2 | - | - | - | KANSAS |
| KENTUCKY | 799 | 293 | 506 | 292 | 214 | 266 | 168 | 16 | - | - | - | 88 | - | 5 | 295 | - | - | - | 95 | - | 4 | 82 | 8 | 35 | 101 | 1 | - | - | - | KENTUCKY |
| LOUISIANA | 1,186 | 354 | 1,132 | 1,132 | - | 1,132 | - | - | - | - | - | 146 | - | 186 | - | - | - | - | - | - | - | - | - | 68 | 626 | - | - | - | - | LOUISIANA |
| MAINE | 72 | - | 72 | 72 | - | 72 | - | - | - | - | - | 2 | 2 | 68 | - | - | - | - | - | - | - | - | - | 5 | 30 | - | - | - | - | MAINE |
| MARYLAND 1/ | 236 | - | 236 | 75 | 161 | 236 | - | - | - | - | - | 75 | - | - | - | - | - | 22 | - | - | - | 3 | - | 102 | 1 | - | - | - | - | MARYLAND |
| MASSACHUSETTS | 127 | - | 127 | 6 | 121 | 127 | - | - | - | - | - | - | - | - | - | - | - | 14 | 80 | 28 | - | 16 | 3 | 28 | 17 | 1 | - | - | - | MASSACHUSETTS |
| MICHIGAN | 345 | 109 | 237 | 165 | 72 | 212 | 22 | 103 | 12 | 11 | - | 63 | 28 | 271 | - | 13 | 7 | - | - | - | 1 | 26 | - | 170 | 163 | 73 | - | - | - | MICHIGAN |
| MINNESOTA | 2,172 | 911 | 1,261 | 887 | 374 | 976 | 15 | 294 | - | - | - | 643 | - | 595 | - | - | - | - | - | - | - | - | - | 527 | 15 | - | - | - | - | MINNESOTA |
| MISSISSIPPI | 27 | - | 27 | 27 | - | 27 | - | - | - | - | - | - | - | 27 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | MISSISSIPPI |
| MISSOURI | 2,210 | 281 | 1,929 | 1,575 | 354 | 1,580 | 169 | 180 | - | - | - | 1,390 | - | 149 | - | - | - | - | 25 | 1 | 2 | 18 | - | 168 | 180 | - | - | - | - | MISSOURI |
| MONTANA | 953 | 154 | 801 | 801 | - | 312 | - | 489 | 35 | - | - | 277 | - | 489 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | MONTANA |
| NEBRASKA | 1,527 1/ | 198 | 1,329 | 1,283 | 46 | 898 | 170 | 261 | - | - | - | 898 | 112 | 60 | - | - | - | - | - | - | - | 58 | - | - | - | - | - | - | - | NEBRASKA |
| NEVADA | 953 | 9 | 944 | 530 | 14 | 117 | 14 | 813 | - | - | - | 117 | - | 813 | - | - | - | - | - | - | - | 14 | - | - | - | - | - | - | - | NEVADA |
| NEW HAMPSHIRE | 238 | - | 238 | 238 | - | 215 | 23 | 36 | - | - | - | 179 | - | 30 | - | - | 3 | - | 6 | 3 | - | - | - | - | 17 | - | 1/ | 1 | - | - | NEW HAMPSHIRE |
| NEW JERSEY | 31 | - | 31 | - | 31 | - | 7 | 24 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 28 | 3 | - | 1/ | 1 | - | - | NEW JERSEY |
| NEW MEXICO | 830 | 590 | 215 | 197 | 18 | 111 | 104 | - | - | - | - | 8 | 34 | 35 | - | - | - | - | 3 | - | - | - | - | 4 | 1 | - | - | - | - | - | NEW MEXICO |
| NEW YORK | 1,886 | 41 | 1,165 | 10 | 1,153 | 336 | 780 | 47 | - | - | - | 9 | 11 | - | - | - | - | 38 | 9 | 10 | 63 | 565 | 16 | 226 | 295 | 19 | - | - | - | - | NEW YORK |
| NORTH CAROLINA | 142 | 20 | 122 | 122 | - | 122 | - | - | - | - | - | - | 120 | 2 | - | - | - | 10 | - | - | - | - | - | 1 | 2 | - | - | - | - | - | NORTH CAROLINA |
| NORTH DAKOTA | 1,439 | 372 | 1,067 | 1,067 | - | 815 | 98 | 154 | - | - | - | 815 | 98 | 154 | - | - | - | - | - | - | - | - | - | 3 | 7 | - | - | - | - | - | NORTH DAKOTA |
| OHIO | 977 | - | 977 | 412 | 565 | 18 | 400 | 559 | - | - | - | 5 | 17 | 353 | - | 9 | 28 | - | 73 | 98 | - | 42 | 23 | 8 | 200 | 42 | 5 | 80 | 44 | OHIO |
| OKLAHOMA | 518 | 208 | 310 | 296 | 14 | 265 | 28 | - | - | - | - | 296 | - | - | - | - | - | - | - | - | - | - | - | 20 | 28 | - | - | - | - | OKLAHOMA |
| OREGON | 231 | 46 | 187 | 148 | 39 | 84 | 110 | 93 | - | - | - | 82 | - | 86 | - | - | - | - | 105 | - | - | - | 28 | 2 | 4 | - | - | - | - | OREGON |
| PENNSYLVANIA 1/ | 3,466 | - | 3,466 | 3,308 | 158 | 3,331 | 45 | 90 | - | - | - | 2,912 | - | 42 | 525 | 8 | 21 | - | 1 | 1 | 1 | 5 | 2 | 95 | 31 | 12 | - | - | 2 | PENNSYLVANIA |
| RHODE ISLAND | 31 | - | 31 | 31 | - | 31 | - | - | - | - | - | - | - | - | - | - | - | 6 | - | - | - | - | - | 25 | - | - | - | - | - | RHODE ISLAND |
| SOUTH CAROLINA | 866 | 151 | 717 | 473 | 244 | 316 | 136 | 265 | 208 | - | 208 | 2 | - | - | - | - | - | - | - | - | - | - | - | 108 | 136 | - | - | - | - | SOUTH CAROLINA |
| SOUTH DAKOTA | 907 | 61 | 846 | 436 | 32 | 257 | 7 | 208 | - | - | - | 232 | - | - | - | - | 202 | - | - | - | - | - | - | 25 | 7 | - | - | - | - | SOUTH DAKOTA |
| TENNESSEE 4/ | 995 | 124 | 871 | 189 | 682 | 185 | 37 | - | - | - | - | 189 | - | - | - | - | - | 81 | - | - | 77 | 13 | - | 15 | 24 | - | 3 | 7 | - | TENNESSEE |
| TEXAS | 3,190 | 1,155 | 1,735 | 905 | 1,028 | 1,580 | 60 | 895 | - | - | - | 348 | 23 | 115 | 80 | - | - | 393 | 223 | 50 | 72 | 13 | 35 | 193 | 180 | 3 | - | - | - | TEXAS |
| UTAH | 462 | 12 | 450 | 431 | 19 | 123 | 296 | 73 | - | - | - | 183 | 241 | 62 | - | - | - | - | 6 | 2 | - | 6 | 2 | - | 9 | 4 | - | - | - | UTAH |
| VERMONT | 90 | - | 90 | 5 | 85 | - | 90 | - | - | - | - | - | - | - | - | - | - | - | 62 | - | - | - | - | - | 27 | - | - | - | - | VERMONT |
| VIRGINIA | 290 | 29 | 261 | 239 | 22 | 196 | 57 | 47 | 98 | - | 1 | 47 | 15 | - | 17 | 2 | 41 | - | - | - | - | 8 | - | 3 | 3 | - | - | - | - | VIRGINIA |
| WASHINGTON | 705 | 117 | 588 | 583 | 5 | 387 | 98 | 103 | - | - | - | 108 | - | 405 | - | - | - | - | - | - | - | - | - | 14 | 58 | 23 | - | - | - | WASHINGTON |
| WEST VIRGINIA | 492 | 92 | 400 | 187 | 213 | 188 | 188 | 21 | - | - | - | 23 | 72 | 16 | 46 | - | - | - | - | 24 | 98 | 29 | - | 29 | 5 | 1 | - | - | - | WEST VIRGINIA |
| WISCONSIN | 1,179 | 74 | 1,105 | 985 | 120 | 791 | 95 | 31 | - | - | 9 | 582 | - | - | - | - | - | - | 42 | - | - | 9 | - | 189 | 176 | - | - | - | - | WISCONSIN |
| WYOMING | 339 | 21 | 318 | 318 | - | 318 | - | - | - | - | - | 318 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | WYOMING |
| SUB-TOTAL | 39,971 | 6,394 | 29,577 | 23,568 | 10,009 | 17,664 | 6,210 | 5,706 | 867 | 11 | 498 | 21,101 | 1,328 | 4,435 | 1,091 | 115 | 136 | 580 | 694 | 192 | 308 | 1,043 | 125 | 3,702 | 2,926 | 288 | 3/ 12 | 99 | 46 | SUB-TOTAL |
| TOTAL | 39,971 | 6,394 | 29,577 | 29,577 | | 29,577 | | | 1,362 | | | 16,686 | | | 1,362 | | | 1,466 | | | 1,476 | | | 6,916 | | 3/ | 133 | | | TOTAL |

NOTES: 1/ IN STATES NOT USING CALENDAR YEAR THE YEARS END AS FOLLOWS: ALABAMA AND MARYLAND, SEPTEMBER 30; PENNSYLVANIA, MAY 31; AND MISSISSIPPI, JANUARY 31, 1933. TWO STATES, GEORGIA AND TENNESSEE, REPORT FOR PERIOD ENDING DECEMBER 31 INSTEAD OF JUNE 30 AS IN PREVIOUS YEARS.
2/ INCLUDES SHOWN PREVIOUSLY UNIMPROVED EARTH ROADS, IMPROVED TO AN ESTABLISHED GRADE AND DRAINED.
3/ SUBDIVISION ACCORDING TO LOW AND HIGH TYPES, AND ALSO ACCORDING TO TYPE OF ROAD ON WHICH PLACED; LOW TYPES INCLUDE SAND-CLAY, GRAVEL AND WATERBOUND MACADAM, HIGH TYPES INCLUDE BITUMINOUS MACADAM AND BETTER TYPES.
4/ ALL BRICK PAVEMENT EXCEPT ONE MILE OF STONE BLOCK PAVEMENT IN NEW JERSEY.
5/ REPORT COVERS A YEAR AND A HALF; FROM JUNE 30, 1931 TO DECEMBER 31, 1932.
6/ INCLUDES 36 MILES OF ROAD WIDENING.
7/ INCLUDES 38 MILES OF RECONSTRUCTION.

## State Highway System Mileage Existing at End of 1932

| STATE | DATE (YEAR 1932) | GRAND TOTAL MILEAGE STATE HIGHWAY SYSTEM 1/ | EARTH ROADS, NON-SURFACED TOTAL NON-SURFACED MILEAGE | UNIMPROVED AND PARTLY GRADED | IMPROVED TO ESTABLISHED GRADE, AND DRAINED | TOTAL SURFACED MILEAGE | SURFACED ROADS BY TYPE SUB-TOTAL LOW TYPE SURFACE 2/ | SUB-TOTAL HIGH TYPE SURFACE 3/ | SAND-CLAY AND TOP SOIL | GRAVEL (GRIT, ETC. (TREATED AND UNTREATED) | WATERBOUND MACADAM (TREATED AND UNTREATED) | BITUMINOUS MACADAM BY PENETRATION | BITUMINOUS CONCRETE (INCLUDES SHEET ASPHALT) | PORTLAND CEMENT CONCRETE | BLOCK PAVEMENT VITRIFIED BRICK | BLOCK ASPHALT (A) WOOD (W) STONE (S) | REVISION OF SYSTEM DURING YEAR, MILEAGE ADDED OR SUBTRACTED | STATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALABAMA | 9/30 | 5,553 | 1,502 | 792 | 710 | 4,051 | 3,002 | 1,089 | 1,085 | 1,895 | 22 | 166 | 153 | 730 | - | - | 5 | ALABAMA |
| ARIZONA | 12/31 | 2,895 | 818 | 951 | 267 | 2,077 | 1,853 | 234 | 190 | 1,653 | - | 26 | 72 | 138 | - | - | 148 | ARIZONA |
| ARKANSAS | 12/31 | 9,030 | 1,540 | 715 | 825 | 7,490 | 5,478 | 2,002 | - | 5,478 | - | 248 | 622 | 1,032 | - | - | 315 | ARKANSAS |
| CALIFORNIA | 12/31 | 7,987 | 2,070 | 1,641 | 4,276 | 5,277 | 2,141 | 3,136 | - | 2,141 | - | 419 | 666 | 1,990 | - | - | - 42 | CALIFORNIA |
| COLORADO | 12/31 | 9,136 | 4,566 | 4,150 | 420 | 4,570 | 4,203 | 367 | 66 | 4,137 | - | - | 15 | 365 | - | - | - 139 | COLORADO |
| CONNECTICUT | 12/31 | 2,251 | 99 | - | 99 | 2,242 | 1,224 | 1,018 | - | 209 | 935 | 315 | 195 | 546 | 2 | - | - | CONNECTICUT |
| DELAWARE | 12/31 | 444 | 22 | 14 | 8 | 422 | 26 | 396 | - | 76 | 20 | 48 | 18 | 154 | 6 | - | 68 | DELAWARE |
| FLORIDA | 12/31 | 8,364 | 3,287 | 3,080 | 207 | 5,058 | 3,660 | 1,398 | 864 | 28 | 2,767 | 102 | 185 | 928 | 269 | (A) 67 | 7 | FLORIDA |
| GEORGIA 2/ | 12/31 | 8,284 | 1,740 | 3,287 | 4,253 | 6,526 | 2,777 | 3,749 | 1,539 | 763 | 496 | 144 | 298 | 1,039 | 3 | - | 1,133 | GEORGIA |
| IDAHO | 12/31 | 4,612 | 1,567 | 1,102 | 465 | 3,245 | 3,003 | 242 | 33 | 2,970 | - | 28 | 158 | 56 | - | - | 24 | IDAHO |
| ILLINOIS 3/ | 12/31 | 10,099 | 1,109 | 925 | 184 | 8,990 | 11 | 8,979 | - | 10 | 1 | 3 | 7 | 8,736 | 233 | - | 19 | ILLINOIS |
| INDIANA | 12/31 | 4,374 | 210 | - | 210 | 4,164 | 3,229 | 4,174 | - | 2,702 | 1,295 | 581 | 92 | 1,439 | 104 | - | 1,405 | INDIANA |
| IOWA | 12/31 | 9,373 | 588 | 472 | 116 | 7,785 | 3,410 | 4,375 | - | 3,410 | - | - | - | 4,375 | 61 | - | 61 | IOWA |
| KANSAS | 12/31 | 8,982 | 3,670 | 3,409 | 261 | 5,312 | 3,950 | 1,362 | 2,353 | 1,597 | - | 176 | 3 | 1,023 | 162 | - | - | KANSAS |
| KENTUCKY | 12/31 | 6,842 | 1,278 | 956 | 322 | 5,564 | 3,937 | 1,627 | - | 1,187 | 2,750 | 839 | 47 | 736 | 5 | - | 892 | KENTUCKY |
| LOUISIANA | 12/31 | 11,925 | 6,008 | 5,403 | 605 | 11,477 | 9,436 | 2,041 | - | 9,436 | - | 12 | 892 | 1,792 | 5 | - | 358 | LOUISIANA |
| MAINE | 12/31 | 1,995 | 87 | 87 | - | 1,908 | 1,588 | 320 | - | 1,588 | - | 1 | 295 | 19 | - | - | 14 | MAINE |
| MARYLAND | 9/30 | 3,644 | - | - | - | 3,644 | 1,776 | 1,868 | - | 636 | 1,140 | 132 | 168 | 1,567 | 1 | - | 232 | MARYLAND |
| MASSACHUSETTS | 12/31 | 1,761 | - | - | - | 1,761 | 237 | 1,524 | - | 52 | 169 | 524 | 250 | 567 | - | (S) 3 | 42 | MASSACHUSETTS |
| MICHIGAN 4/ | 12/31 | 8,422 | 578 | 370 | 208 | 7,844 | 3,936 | 3,908 | 102 | 3,353 | 481 | 31 | 402 | 3,404 | 11 | - | 125 | MICHIGAN |
| MINNESOTA | 12/31 | 6,777 | 57 | 57 | - | 6,720 | 4,293 | 2,427 | 95 | 4,198 | - | - | 76 | 2,630 | 6 | (W) 3 | - 91 | MINNESOTA |
| MISSISSIPPI | 1/31/33 | 6,070 | 847 | 147 | 700 | 5,223 | 4,697 | 526 | 1 | 4,696 | 11 | 52 | 25 | 440 | 13 | - | - 8 | MISSISSIPPI |
| MISSOURI | 12/31 | 10,487 | 1,308 | 983 | 325 | 9,179 | 5,648 | 3,531 | - | 5,648 | - | 234 | 44 | 3,234 | 19 | - | 1,320 | MISSOURI |
| MONTANA | 12/31 | 6,177 | 5,219 | 4,918 | 301 | 2,958 | 2,899 | 59 | 86 | 2,813 | - | 16 | 7 | 36 | - | - | 29 | MONTANA |
| NEBRASKA | 12/31 | 9,752 | 1,790 | 1,564 | 226 | 6,962 | 5,961 | 601 | - | 5,961 | - | - | 17 | 951 | 51 | - | - | NEBRASKA |
| NEVADA | 12/31 | 3,782 | 1,784 | 1,727 | 57 | 1,998 | 1,919 | 79 | - | 1,919 | - | 21 | 29 | 29 | - | - | - 15 | NEVADA |
| NEW HAMPSHIRE | 12/31 | 2,862 | 36 | 5 | 31 | 2,826 | 2,389 | 437 | - | 2,251 | 98 | 169 | 45 | 223 | - | - | 179 | NEW HAMPSHIRE |
| NEW JERSEY | 12/31 | 1,877 | 168 | 153 | 15 | 1,709 | 117 | 1,592 | - | 65 | 52 | 9 | 296 | 1,270 | 9 | 7/ (AND) 47 | - | NEW JERSEY |
| NEW MEXICO | 12/31 | 10,294 | 7,292 | 5,882 | 1,410 | 3,002 | 2,994 | 108 | - | 2,994 | - | - | 15 | 12 | - | - | 582 | NEW MEXICO |
| NEW YORK | 12/31 | 13,947 | 1,960 | 1,930 | 30 | 11,987 | 1,271 | 10,716 | - | 107 | 1,164 | 3,204 | 1,278 | 6,045 | 174 | 8/ (AS) 15 | - 53 | NEW YORK |
| NORTH CAROLINA 9/ | 12/31 | 10,033 | 1,124 | 118 | 1,006 | 8,909 | 4,586 | 4,323 | 3,575 | 702 | 309 | 669 | 1,014 | 2,639 | 1 | 10/ - | 281 | NORTH CAROLINA |
| NORTH DAKOTA | 12/31 | 7,981 | 2,772 | 1,922 | 850 | 4,819 | 4,798 | 21 | - | 4,798 | - | - | 1 | 20 | - | - | 5 | NORTH DAKOTA |
| OHIO | 12/31 | 11,798 | 58 | 58 | - | 11,461 | 5,320 | 6,301 | - | 4,157 | 1,163 | 1,668 | 911 | 2,609 | 1,957 | - | 200 | OHIO |
| OKLAHOMA | 12/31 | 7,179 | 2,716 | 2,173 | 543 | 4,463 | 2,543 | 1,920 | - | 2,543 | - | - | 275 | 1,595 | 62 | - | 309 | OKLAHOMA |
| OREGON | 12/31 | 4,574 | 728 | 528 | 200 | 3,846 | 2,395 | 1,451 | - | 2,395 | - | 568 | 280 | 233 | - | - | 104 | OREGON |
| PENNSYLVANIA 11/ | 5/15 | 34,020 | 14,952 | 14,952 | - | 19,068 | 10,976 | 8,092 | - | 7,634 | 3,342 | 921 | 716 | 6,295 | 537 | 12/ (AND) 23 | 13/ 20,467 | PENNSYLVANIA |
| RHODE ISLAND | 12/31 | 1,070 | 440 | 263 | 176 | 621 | 128 | 493 | - | 32 | 96 | 230 | 173 | 148 | - | - | 24 | RHODE ISLAND |
| SOUTH CAROLINA | 12/31 | 5,978 | 378 | 205 | 173 | 5,581 | 3,191 | 2,390 | 2,995 | 693 | 43 | 4 | 446 | 1,922 | - | - | - 17 | SOUTH CAROLINA |
| SOUTH DAKOTA | 12/31 | 7,987 | 1,257 | 995 | 262 | 6,730 | 4,595 | 2,135 | 20 | 4,595 | - | - | 5 | 160 | - | - | 10 | SOUTH DAKOTA |
| TENNESSEE 5/ 13/ | 12/31 | 7,226 | 784 | 294 | 490 | 6,442 | 4,191 | 2,251 | - | 3,220 | 971 | 435 | 607 | 1,190 | 18 | (W) 1 | 173 | TENNESSEE |
| TEXAS | 12/31 | 19,263 | 6,560 | 3,852 | 2,708 | 12,703 | 2,995 | 10,108 | 50 | 2,528 | 24 | 5,158 | 1,724 | 3,226 | 48 | - | 374 | TEXAS |
| UTAH | 12/31 | 4,122 | 1,575 | 438 | 1,137 | 2,547 | 2,183 | 364 | - | 2,183 | - | 7 | 85 | 272 | - | - | 14 | UTAH |
| VERMONT | 12/31 | 1,013 | - | - | - | 1,013 | 485 | 528 | - | 480 | 5 | 258 | - | 240 | - | - | - | VERMONT |
| VIRGINIA | 12/31 | 4,154 | 1,852 | 1,610 | 186 | 4,302 | 4,142 | 1,607 | (W) | 2,699 | 1,434 | 790 | 75 | 742 | - | - | 122 | VIRGINIA |
| WASHINGTON | 12/31 | 3,711 | 264 | 177 | 87 | 3,447 | 2,430 | 1,017 | - | 80 | - | 80 | 33 | 994 | 18 | - | - 48 | WASHINGTON |
| WEST VIRGINIA | 12/31 | 4,380 | 912 | 480 | 432 | 3,468 | 1,488 | 1,980 | - | 1,398 | 90 | 895 | 144 | 919 | 95 | - | 65 | WEST VIRGINIA |
| WISCONSIN | 12/31 | 10,218 | 200 | - | 200 | 10,018 | 5,880 | 4,138 | 46 | 5,795 | 439 | 187 | 95 | 3,525 | 1 | - | - | WISCONSIN |
| WYOMING | 12/31 | 3,383 | 1,099 | 674 | 425 | 2,290 | 2,295 | 35 | - | 2,295 | - | - | 27 | 8 | - | - | 158 | WYOMING |
| TOTAL | - | 358,210 | 92,150 | 72,743 | 19,407 | 266,060 | 156,385 | 109,735 | 13,158 | 123,870 | 19,297 | 20,009 | 12,179 | 73,984 | 3,401 | (A) 98 (W) 15 (S) 53 | 162 | 29,268 | TOTAL |

NOTES: 1/ HIGHWAYS SELECTED OR DESIGNATED BY LAW AS STATE HIGHWAY SYSTEMS; EXCLUDING STATE SUPERVISED ROADS NOT ON STATE SYSTEM, ROADS UNDER COUNTY OR TOWN AUTHORITIES, AND CITY STREETS.
2/ INCLUDES SAND-CLAY, GRAVEL AND WATERBOUND MACADAM.
3/ INCLUDES BITUMINOUS MACADAM BY PENETRATION AND BETTER TYPES.
4/ REPORT MADE AS OF JUNE 30 IN FORMER YEARS.
5/ EXCLUDES 43 MILES OF CITY STREETS TAKEN INTO STATE SYSTEM.
6/ EXCLUDES 191 MILES OF CITY STREETS TAKEN INTO STATE SYSTEM.
7/ CONSISTS OF 6 MILES OF ASPHALT BLOCK, 3 MILES OF WOOD BLOCK, AND 38 MILES OF STONE BLOCK PAVEMENTS.
8/ CONSISTS OF 12 MILES OF ASPHALT BLOCK, AND 3 MILES OF STONE BLOCK PAVEMENT.
9/ EXCLUDES 261 MILES OF STREETS IN CITIES AND TOWNS TAKEN INTO STATE SYSTEM.
10/ OMITS 18 MILES OF UNCLASSIFIED BRIDGE ROADWAY.
11/ INCREASE OF MILEAGE LARGELY DUE TO RURAL ROAD ACT OF AUGUST 15, 1931 ADDING 20,167 MILES OF TOWNSHIP ROADS TO STATE SYSTEM.
12/ CONSISTS OF 9 MILES OF ASPHALT BLOCK, 5 MILES OF WOOD BLOCK, AND 9 MILES OF STONE BLOCK PAVEMENTS.
13/ A RESURVEY OF STATE SYSTEM WAS MADE IN 1932.

Compiled from reports of State Authorities by the U. S. Department of Agriculture, Bureau of Public Roads

# John Crichton Baxter

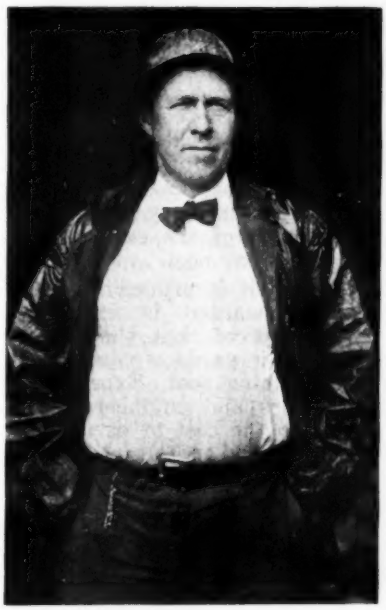
JULY 26th marked the passing of John Crichton Baxter known from coast to coast as a leader in the construction industry. Mr. Baxter died as a result of injuries received in a traffic accident in New York. Construction men throughout the country know the achievements of this genial, stocky, blue-eyed member of the firm of Carey, Baxter & Kennedy, Incorporated. The entire excavating industry mourns his passing.

John Crichton Baxter was born July 16, 1877, in the then quiet village of East Orange, New Jersey. When he was two, his parents took him back to his father's native land, Scotland, where they remained for three years.

Leaving Scotland in 1882, the Baxters returned to America, finally arriving in San Francisco where his father entered the publishing business and John went to school. The family later moved to Salt Lake City and there John finished the public schools and went to high school. Another family migration took John to Portland, Oregon, where he went to work with his father.

On June, 1898, the Spanish-American War brought young Baxter into Company M of the 2nd U. S. Volunteer Engineers and he remained in the army until May, 1899. During his service Company M was stationed in Hawaii and built the original Schofield Barracks outside of Honolulu.

After the war Mr. Baxter returned to Portland and became a rodman for the Oregon Railway & Navigation Company. Six months later he returned to the U. S. Engineers as a civilian recorder. A job followed as instrument man for the Columbia River Paper Company, then instrument man for Morris & Whitehead, then instrument man for the Oregon Short Line Railway, and then transit man on the Northern Pacific Railway. By June, 1902, Mr. Baxter had become assistant engineer for the Northern Pacific Railway from which position he resigned two years later to be-



come transit man for the Grand Trunk Pacific Railway of Canada. He remained here but a short time and came back to the states as a survey man for the U. S. Engineers. On this job he ran the line for the first wagon road to Paradise Valley up near the top of Mount Rainier. He next moved to Tacoma where he worked as city computer and left this job to become resident engineer of the Alaska Central Railway. Having been promoted to division engineer for this line he did considerable traveling through the construction area, and in later years would sometimes tell of the dog teams, freezing cold and interesting anecdotes of the Alaskan Gold Rush Days.

In March, 1907, Mr. Baxter again returned to the states as location engineer for the Chicago, Milwaukee & St. Paul, leaving that company in September, 1909 to become division engineer for the Oregon Trunk Railway. In this position, under that famous railway executive Ralph Budd, he had direct charge of his first important piece of construction, 156 miles of the Oregon Trunk.

Turning from engineering tasks to construction itself, Mr. Baxter entered the employ of Guthrie, McDougall & Company as superintendent of construction in 1912. Four years later he became general superintendent of the reorganized firm of A. Guthrie & Company, Incorporated. The following six years he advanced to Vice-President of the company which position he held until June 1, 1930, when he resigned to become a member of the firm of Carey, Baxter & Kennedy, Incorporated. One of the best known projects carried out under his immediate supervision during his connection with the Guthrie organization was the building of the new Cascade Tunnel. He also had charge of many another famous project including mining and stripping of Mesabi Range iron ore as well as outstanding highway, railroad and general construction jobs.

The original firm of Kennedy & Carey was one that had gained world-wide recognition of its noteworthy work in foreign countries. One of their well known foreign jobs was the construction of 125 miles addition to Bolivia's railway system. At the present time Carey, Baxter & Kennedy, Incorporated, are carrying on a number of large stripping jobs in the coal regions of Pennsylvania which Mr. Baxter was active in organizing and carrying through.

While the head offices of this firm are in New York, Mr. Baxter's home at the time of his death was at Pittsburgh, Pennsylvania, where he could be closer to the work being carried on by the firm in the mining district. The Baxters had formerly, during Mr. Baxter's connection with A. Guthrie & Company, made their home in the Twin Cities, St. Paul and Minneapolis.

Mr. Baxter was a member of the American Institute of Mining and Metallurgical Engineers, the American Society of Civil Engineers, the Engineers Club of New York and other organizations.

He is survived by his wife, Ollie Winnett Baxter, and their son and daughter.

# FIELD NOTES

### Right to Extra Pay for Unexpected Artificial Obstacles

WHERE a contractor for excavation for a building unexpectedly encountered 128.65 cubic yards of concrete comprising an old swimming pool buried below the surface of the lot, it was not an excessive award to allow him $1,290 extra compensation. That is the gist of the decision rendered by the Kentucky Court of Appeals in the late case of Heyburn Building Co. v. Highland Motor Transfer Co., 53 S. W. 2d, 944.

Before the contracting company bid on the job its representatives visited the site and saw brick and stone scattered on the surface of the lot, indicating that old foundation walls might be encountered. But they made no soundings and no inquiry as to artificial underground obstructions, except as to sewer pipes, etc. Both testified that if they had known of the buried swimming pool they would have increased the bid.

There was evidence that the nature of the soil in the locality was known to local contractors, and that it was of such a nature that it could be excavated with a steam shovel, and that the inspection of the premises made was such as is usually made by prospective bidders in similar circumstances. The contractor was furnished specifications for the building prepared by a firm of eminent architects. The specifications made no reference to any underground obstacles, but did provide for additional compensation in the event extra work was required in filling quicksand pockets or other soft spots. The specifications also provided, in substance, that bidders should inspect the premises in order to determine the existing conditions and the nature and scope of the work before submitting proposals, and that contractors should do all the excavating necessary as shown by drawing, and remove from the premises all surplus excavated materials and debris.

There was also some evidence that it has been a custom in Louisville for years in razing buildings on lots not to be immediately improved to only remove materials to the surrounding surface and to fill basements and depressions with the debris.

Upholding judgment in favor of the contractor, the Court of Appeals said: "In the light of the foregoing and other proven facts and circumstances, there is no escape from the conclusion that the trial court could not as a matter of law determine that appellee [the contractor] knew or by the exercise of ordinary care could have known of the existence of this swimming pool. . . .

"Finally it is argued that the damage awarded is excessive. There is proof that there were 128.65 cubic yards of concrete in the swimming pool. Experienced contractors and engineers testified as to the cost of excavating such material, and their evidence indicates a minimum of $10 per cubic yard, so it is at once apparent that the verdict cannot be set aside as excessive."

*—A. L. H. Street,*
*Attorney-at-Law.*

### Neat Pressure Gauge Mountings

A GREAT many odd and sometimes unsatisfactory home-made arrangements are often made and used as pressure gauge brackets when one wishes to mount an additional or extra gauge on some flat surface. Getting it out from some place to better it's visibility is generally the problem. A discarded auto part from our plentiful supply of junked cars can in most cases fill this need nicely. Old auto horn bracket castings can be found in so many different shapes, sizes, and forms that it is not hard to quickly and inexpensively get just what you want and need for this purpose. The gauge rim and the horn end of the bracket can be quickly drilled for as many small holding bolts as you need. The footing bolt holes are always large enough for anchor bolts of sufficient size. These discarded horn brackets make a mounting or holder which is very neat, practical and easily applied.

*—Frank W. Bentley, Jr.*

### Tire Failures Due to Wrong Sized Rims

MANY truck tire failures have been traced directly to tires being used on wrong sized rims. The tire division development department of *The B. F. Goodrich Company, Akron, Ohio,* recently completed tests on a pair of 6-inch ten-ply tires—one mounted on a 5-inch rim and the other mounted on a 6-inch rim. These tests were conducted in the usual way, all conditions being equal except the rims on which the tires were used. The tire tested on the 5-inch rim was not only broken on the shoulder because of the excessive flexing of the tire on the narrow rim, but it was also broken above the rim flange.

The second tire which was tested on the 6-inch rim showed no signs of failure.

The lack of rim support when a tire is mounted on an undersized rim contributed to the failure of the one tire, it is pointed out. Corresponding premature failures may also be expected in the larger sizes when used on undersized rims, according to Goodrich tire engineers. They advise dealers and fleet operators to see that proper sized rims are used, insuring economical tire service.

### Moistureproof Bag

A BAG lined with Moistureproof Cellophane has been developed by the Rockland and Rockport Lime Corporation of Rockland, Maine, in which lime may be stored for a year or more without taking on moisture. It is believed that, as a result of this development, the usual hazard of having the lime heat up or swell and break out of its container is eliminated.

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First Sparrow: "Are you going South this winter?"

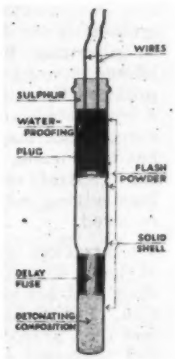
Second Sparrow: "Am I? Say, I wouldn't miss the Agua Caliente Derby for a peck of grass seed."

# EQUIPMENT

## *You Ought to Know About*

### New Type of Delay Blasting Cap

A NEW all-metal delay electric blasting cap, revolutionary in design, is announced by *Hercules Powder Company, Wilmington, Delaware.*




The outstanding features of the new detonator are the firing and delay elements that produce practically no gas when burning. These features make possible the use of a solid, one piece, ventless shell. The new delay cap, having no hot gas, cannot cause ignition of the dynamite. Needing no gas-escape openings in the shell no moisture can enter, a usual cause of misfires in other types of delays.

According to the manufacturer, the new type detonator represents the greatest advance in detonator construction since the invention of the electric blasting cap. Hundreds of thousands of the new delays have been tested in the field with unvaryingly satisfactory results, according to Hercules explosives authorities. U. S. patents have been applied for on this new cap and are pending at this time.

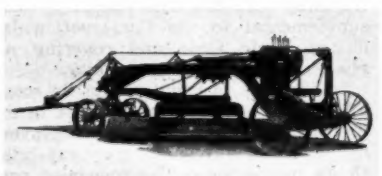
### New Welder for Railroad Maintenance

A NEW and unique tractor welder, capable of operating along the shoulder of the track entirely clear of trains, has

been recently developed by *Westinghouse Electric and Manufacturing Company,* East Pittsburgh, Pennsylvania. It is designed particularly for reclaiming battered rail ends, crossovers, switches, frogs, repairing bridge structures and for other welding operations, and will also provie useful for auxiliary power for maintenance of way tools such as rail grinders, drills, slotters, etc. The welding and power units are entirely self contained, furnishing welding current for one operator, power for tools, and power for propelling the tractor. For complete information write the manufacturer, mentioning *Excavating Engineer.*

### New "Caterpillar" Power Controlled Elevating Grader

A POWER CONTROLLED elevating grader of new design and great capacity was recently announced by *Caterpillar Tractor Company, Peoria, Illinois.* This machine incorporates such features as an arched "A" frame giving ample clearance for the carrier and permitting a higher lift for loading large wagons, three point suspension of the frame protecting it from twisting strains, and a swivel king bolt allowing full oscillation



of the front wheels and extremely short turns. Drum type wheels cannot clog with dirt and both front and rear axles are extensible to balance the weight of the carrier.

Full power control is provided; four power levers control adjustments of carrier and plow. A 45 horsepower "Caterpillar" engine is mounted to balance the carrier, and give the operator an unobstructed view. The 48-inch belt is driven by enclosed gears and a universal shaft along the rear.

The standard 19-ft. carrier may be increased to 22 or 25 feet by extensions. An automatic reverse check is provided so the dirt cannot roll back in front of the plow when the clutch is released. The "free floating" plow beam is a built-up box section weighing 675 pounds. Suspended on chains, it is protected from hidden obstructions, a uniform furrow is insured and easy, accurate adjustment permitted.

### Oxweld Aluminum Flux

A NEW aluminum welding flux, Oxweld Aluminum Flux, is announced by *The Linde Air Products Company,* 30 East 42nd Street, New York, N. Y. It is intended to replace the two fluxes previously marketed, one for welding pure aluminum and the other for welding aluminum alloys.

### Ingersoll-Rand "Jackbits"

DETACHABLE rock drill bits called "Jackbits" were recently announced by *Ingersoll-Rand Company, 11 Broadway, New York,* for small contractors, quarries, etc., where the operation of a sharpener and blacksmith is not warranted or where the handling of machine-sharpened drill steels is unusually difficult or expensive.

Jackbits are secured directly onto the end of the drill rod by means of a sturdy, shallow, reverse buttress-type thread of a carefully determined angle. This thread keeps the bit tight while in use and makes it easily detachable for changing. The maximum hammer blow is transmitted through the end of the rod, close to the cutting edge, and there is no pressure on the threads.

Other features pointed out by the manufacturer are large clearance grooves to pass cuttings from the bottom of the hole, a counter-sunk hole in the center of the cutting edge which acts as a pilot to guide the bit, and cadmium plating to prevent rusting and to give a bright finish which minimizes the loss of bits.

# SHOTS
# *from the Firing Line*

## One-third of Public Works Fund Allocated

PUBLIC WORKS Administrator Harold L. Ickes announced August 20th that allocations had been made to date from the public works fund totaling $1,196,721,389.

Allotments over the nine-week period since the National Recovery Act went on the statute books averaged $132,969,043 per week. At this rate the entire fund would be alloted in a period of six months. Mr. Ickes estimated that for every man employed at the site of these public works projects, two others would be given employment "behind the lines."

The money allotted has been largely for Federal projects, these having been selected first because tehre was existing machinery to get them underway with the minimum of delay. Several non-federal projects have been approved, however, including housing projects in Boston, Philadelphia, Brooklyn, New York and Hutchinson, Kansas, as well as the Triborough Bridge in New York. Other non-federal projects will be approved soon.

Allotments of special interest to the excavating field include: $50,000,000 for the Tennessee Valley Authority; $400,000,000 for highways; $1,550,000 for Great Smoky National Park; $25,000,000 for forest highways and forest roads and trails; $5,000,000 for Public Land Roads; $1,096,000 for the Alaska Road Commission; $4,000,000 for Indian Reservation Roads; $1,250,000 for National Park Service improvements; $16,000,000 for park roads and trails; $44,460,000 for reclamation including Boulder Canyon, Owyhee, Vale, Ellensburg and Ronald projects; $22,700,000 for Casper-Alcova reclamation; $63,000,000 for Grand Coulee, Columbia Basin development; $8,555,000 for flood control; $11,500,000 for channels up on the upper Mississippi; $1,000,000 for the Panama Canal; $44,200,000 for the Triborough Bridge Authority, New York.

## Master Code for the Construction Industry

THE CONSTRUCTION LEAGUE of the United States has prepared and submitted to The National Recovery Administration a master code to govern the construction industry.

Different national groups within the construction industry are preparing supplementary codes which will be submitted as they are completed.

The master code gives a general basis for control of the industry with trade practices left to the individual codes except that "bid peddling" is prohibited in the base code. It also provides: a minimum hourly wage of 40 cents per hour (unless the hourly rate for the same class of work was less than 40 cents on July 15, 1929 in which case the 1929 rate will apply but in no event will it be less than 30 cents); maximum hours to average no more than 35 hours a week for any six months period but with the right to work a maximum week of 48 hours in such period but no more than 8 hours in any one day. Executive, administrative and supervisory positions are excepted as are also cases of emergency requiring protection of life and property. Employment of minors under 16 is prohibited. Employees are assured freedom to join or belong to unions of their own selection.

The construction industry is defined to include architects, engineers, contractors, subcontractors, producers, fabricators and distributors engaged in designing, constructing, assembling, installing and applying manufactured parts and products and the supplying of materials of structures and other fixed improvements and modifications thereto.

## A.R.B.A. Submits Highway Code

THE American Road Builders' Association has submitted a proposed Highway Construction Industry Code supplemental to the Construction Industry Basic Code and covering all phases of the highway industry.

It proposes to bring within its scope all employers of persons engaged in the highway industry. (Public employers by voluntary agreement may subscribe to its provisions.) The code also provides a means whereby unattached nationally organized manufacturing and material producing groups whose products are used in highway work may file supplementary codes.

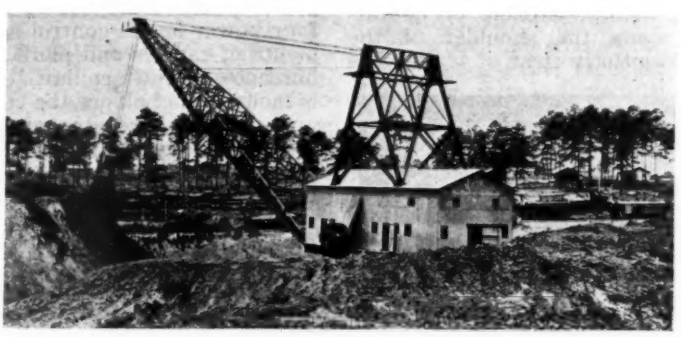
The Highway Code provides for abiding by minimum wages and maximum hours set by the Construction Code except as provided by the Emergency Highway Construction provisions in connection with Public Works Act appropriations. Required accounting records are to be kept and copies of pay rolls furnished, payments received are to be applied first to paying job costs; wages are to be paid in legal tender or bankable checks and no rebates accepted. Prequalification of bids is endorsed and highway contractors are required to file complete information on performance and financial standing with the Bureau of Contract Information Incorporated or other agency designated by the N.R.A. Quotations must be in writing; bids below cost are prohibited, must provide reasonable profit; estimates must be kept on file. A contractor cannot revise his bid after opening but may withdraw if an error has been made. In letting subcontracts the general contractor is prohibited from giving out information from bids received.

Contractors are required to perform at least 80 per cent of the value of their contract with their own organization. Payments to subs must be not less than proportionate amount of partial payments received with final payment in not less than ten days after receipt of final settlement. Where disputes occur rules of the American Arbitration Associations are to apply except as otherwise provided for.

Financing of a contractor by subcontractors or material vendors is prohibited as is also giving or accepting rebates, splitting of commissions. Defamation of competitors, interference in contracts, deceptive practices, convict labor and enticement of employees become illegal under the code. Cooperation toward accident prevention is required.

The Highway Construction Council agrees to collaborate in formulating credit terms and fair purchasing equipment practices for codes covering highway equipment and materials; and the industry agrees to patronize establishments operating under the N.I.R.A.

Cost of administering the code is to be prorated except that no charge shall be made to governmental units.



*Hall Construction Company uses the above Bucyrus-Monighan 6160 dragline for removing overburden for the Attapulgus Clay Company. The machine operates with electric power using Ward Leonard control. In the background may be seen three railway type shovels, dump cars and locomotives which the big dragline replaced.*

### Crushed Stone, Sand and Gravel and Slag Industries Code

THE National Recovery Administration will hold a formal meeting on the code of fair competition for the crushed stone, sand and gravel and slag industries in Washington on Monday, August 28th. Open meetings are being held by the industries committee on organization on August 25th and 26th. At these open hearings this committee hopes to be able to eliminate all remaining differences of opinion in so far as that is possible on the present tentative code.

By the time this issue of Excavating Engineer reaches you, it is hoped that an approved code will have been established satisfactory to the National Recovery Administration and to the interested industries.

### National Bituminous Pavers' Industrial Association Adopts Code

AS A RESULT of a meeting held at Washington on August 9th and 10th by leading asphalt pavement producers, the National Bituminous Pavers' Industrial Association has been formed as a national group to stand behind President Roosevelt's efforts to stimulate industrial recovery.

The two-day session was attended by producers of asphalt type pavements from every section of the country. Speaking in the current mode of initials, the new association adopted a slogan S-I-R, signifying Skill—Integrity—Responsibilty. A code of Fair Practice was adopted which in keeping with the intent of the Recovery Act affords full benefit to labor, and which supervises the quality of the Industry's production to the end that the public shall be assured of appropriate construction and full value for its expenditures.

To obtain self-governing of the Industry along these lines within national scope, thirteen regional administrators or directors were appointed from the ranking industrial leaders of the paving business.

### Minimum Wage Rates Passed by Public Works Board

MINIMUM wage rates on Federal Emergency Administration of Public Works construction were recently approved in a resolution passed by the Public Works Board. The rates established were made under an agreement signed by representatives of the American Federation of Labor, arranged by the United States Department of Labor.

Three wage zone rates are established, southern, central and northern. The rates are to be effective for Federal Public Works fund construction for a period not to exceed 12 months.

Minimum hourly wage rates to be paid on construction projects in the Southern Zone are to be: for skilled labor $1.00 and for unskilled labor 40 cents. In the Central Zone skilled labor is to receive $1.10 and unskilled labor 45 cents; in the Northern Zone, skilled labor $1.20 and unskilled labor 50 cents.

The Southern Zone is to consist of the states of South Carolina, Georgia, Florida, Arkansas, Alabama, Mississippi, Louisiana, Arizona, Oklahoma, Texas, New Mexico. The Central Zone states are Delaware, Maryland, Virginia, Tennessee, Colorado, Utah, California, North Carolina, West Virginia, Kentucky, Missouri, Kansas, Nevada, District of Columbia. The Northern Zone includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Indiana, Wisconsin, Minnesota, Nebraska, Wyoming, Oregon, South Dakota, Idaho, Pennsylvania, Ohio, Michigan, Illinois, Iowa, North Dakota, Montana, Washington.

If collective agreements or understandings between labor and employers on April 30th were above the minimum set for any district, the agreed wage is to apply.

A Board of Labor Review is to be established to hear any disputes regarding wages which may arise and is to consist of three members, one to represent labor, one to represent contractors and a Chairman who shall represent the Federal Administrator of Public Works.

## Warren A. Bechtel Dies in Russia

Sad news of the death of Warren A. Bechtel, President of the Six Companies, and head of the Bechtel-Kaiser Company, Limited, comes to us as we go to press. Mr. Bechtel was in Russia for a visit to Dnieprostroy Dam when death came at the National Hotel at Moscow due to an overdose of a medicine he had taken under doctors orders for several years. Mrs. Bechtel had accompanied him to Europe and was in Vienna at the time of his death.

We extend to his family and associates in the building of Hoover Dam, on behalf of the entire Excavating Industry, sincere sympathy in their bereavement.

### Orders Early Start on 9-Foot Channel

IMMEDIATE construction of a 9-foot channel in the upper Mississippi River from the Twin Cities to St. Louis has been ordered by President Roosevelt. The maximum cost is estimated at $100,000,000 for completion. Of this $80,000,000 will go for wages to the 40,000 men required during the course of work.

Though originally planned as a five-year project, the President has ordered the job to be done in three years, or two years, if possible. Army engineers plan expenditure of $33,000,000 this fall on the upper Mississippi 9-foot channel. An allotment of $11,000,000 for the work has been announced by H. L. Ickes, Public Works Administrator, and an additional $22,000,000 will be apportioned later.

Engineers are preparing to begin at Rock Island, Alma, Fountain City and all other points where work has been suspended. The estimate of $33,000,000 for the upper Mississippi this year was submitted to the public works administration and to President Roosevelt by General Brown. General Brown proposed the engineers begin work simultaneously at all of the 26 dams required.

### 107,538,000 Yards Placed on Mississippi Flood Control in Last Fiscal Year

A REVIEW of the construction work accomplished during the fiscal year ending June 30, 1933, shows a total of over 107,538,000 cubic yards of earthwork placed in levees under Sections 1 and 6 of the Flood Control Act of May 15, 1928. This is the largest amount of earthwork ever placed in levees on the Mississippi River and tributaries in one fiscal year and sets a new record for levee construction. Of the 107,538,000 cubic yards placed 100,987,000 cubic yards were placed on the main river project below Cape Girardeau, Missouri under Section 1, while the remaining 6,551,000 cubic yards were placed on tributaries and above Cape Girardeau under Section 6, of the Flood Control Act of May 15, 1928.

Compared with the placing of 107,538,000 cubic yards during the fiscal year ending June 30, 1933 was placing of 79,373,877 yards in the year ended in 1932; 88,640,527 yards in 1931; 42,731,978 yards in 1930; 22,966,075 in 1929.

During the fiscal year July 1, 1932 to June 30, 1933, approximately 41,000 linear feet of new revetment was placed. As of June 30, 1933, the Bird's Point-New Madrid floodway was within two-tenths per cent of completion; the Bonnet Carré spillway structure was completed and Bonnet Carré side levees completed except a small portion now being constructed. Project channel requirements were maintained throughout the fiscal year 1933 except for a few days at several shoal places during extreme low water in September and October; the bars were quickly removed without serious inconvenience to navigation. Corrective dredging in connection with cut-offs was under way at several locations on the Mississippi and the Atchafalaya Rivers, with pilot

channels opened at three places on the Mississippi River and three places on the Atchafalaya River during the fiscal year.

Only 4,187,425 yards were placed in levees during the month of June, 1932.

## Frank T. Sheets Joins Portland Cement Association

FRANK T. SHEETS, until recently chief highway engineer of Illinois, who for the past twelve years has directed the building of that state's 11,000-mile hard road system, has been appointed consulting engineer of the Portland Cement Association.

Mr. Sheets is recognized as one of the foremost road authorities. Principles of concrete pavement design developed by him or under his direction are in wide use in the United States and in many foreign countries.

He entered highway service in Illinois in 1907 and served continuously until last January, except for time spent as a student at the University of Illinois. Through competitive civil service examinations he rose through the ranks from junior engineer, until in 1921 he was appointed state superintendent of highways. In 1924 he also became chief highway engineer and thereafter served in a dual capacity.

Direction of Illinois' amazing highway program was assumed by Mr. Sheets shortly after the program was adopted. Under his leadership, some 11,000 miles of road, largely hard surfaced, were built. In 1924 he established a record in pavement construction when 1,230 miles of concrete were laid.

## Development of Upper Missouri Requested of Public Works Administration

By PAUL G. FRIGGENS

"OLD MAN River's" eldest son, the Missouri, is going to have $219,000,000 spent in manicuring his long-neglected channels in the next two years, if farmers of the Northwest organized into the Upper Missouri Valley Development Association can get their program okayed as public works.

Submitted to the Public Works Administrator "as a more effective solution of the present deplorable national condition than any legislation creating artificial means of price fixing, rate regulation, group help, tariff barriers or other man-made regulatory law," this huge program is said to have vital effect in the solution of the farm problem, at least so far as the states of Montana, Wyoming, North and South Dakota, Iowa and Nebraska are concerned.

The program advances two distinct classes of benefits: (1) obtain for the upper Missouri area, transportation equality, cheap power for industrial development; conservation of run off waters in the area, irrigation of a large tract of ariable land and development of natural resources, and (2) obtain for the lower river and the nation, flood control; navigational aid in low river stages; elimination of the silt nuisance, increased use of now completed waterways; interior development of the national defense program, and elimination of an injustice of long standing.

Described in a 21 page prospectus presented to the Public Works Administrator at Washington, the plan provides for the development of the Missouri between Sioux City (the head of the approved development of inland waters at present) and the mouth of the Yellowstone river and the construction of a great reservoir at Ft. Peck, above the mouth of the Milk river in Montana.

The total benefits "of a tangible, present and computable nature are believed to be not less than $372,000,000," Will G. Robinson, Pierre, president of the Association declares. The total costs to include all of the elemental projects, are believed to be not greater than $219,000,000.

Necessary in carrying out this huge development, are listed the creation of a navigable channel from Sioux City, Iowa, to Yankton, South Dakota, a six foot channel on the upper river to Ft. Peck; the placing of dams across tributaries to hold silt from the various streams flowing into the Missouri and to act as an adjunct in flood control and water storage; the creation of the Ft. Peck reservoir designed, in addition to storage; to make water available for release to the Lower Missouri and Mississippi in low stages; the creation of a system of canals and laterals in the Missouri valley adjacent to several dams for irrigation; the construction of dams and locks in such a manner as to make the minimum flow of the River available for exploitation for power by private industry at such places and times as markets may become available for hydroelectric power; and finally the creation of a still, slack water lake some 755 miles in length from Gavin's point to the Yellowstone river by a system of dams and locks.

Projectors of the all-inclusive plan for the development of the upper Missouri believe that its consideration at this time is justified. They contend that the expenditure of approximately 6-2/3 per cent of a total of $3,300,000,000 for public works is economically justifiable in this area. They name as the benefits, transportation equality, development of natural resources, power and other advantages.

The project as outlined after extensive surveys by government engineers, can be made essentially self-liquidating.

"The conditions of the Northwest are acute and will not tolerate delay. Relief must come from a development of natural resources and the return of equality of opportunity," President Robinson says. "Legislation dealing with economic law which have in the past and no doubt may in the future obtain results far different than predicted or desired." Added to these benefits, its sponsors declare, are possibilities for the ultimate use of great coal, manganese and aluminum deposits.

But the project is by no means assured yet and five western railroads have raised their voices already in opposition to a nine-foot channel development of the old Missouri.

Attacking the proposed project on the grounds of "excessive cost," the "fallacy" of a reservoir at Ft. Peck, and the general inability of the program to accomplish its stated aims, the railroads deplored the "uniformed and selfish demands, which are being urged in an attempt to influence government action in favor of a government project which can never be a success."

The protest was filed by the Chicago and Northwestern railroad, the Burlington and Quincey, Milwaukee, St. Paul and Pacific, Rock Island and Pacific and Northern Pacific companies.

Almost at the same time, however, army engineers began a tour of inspection along the Missouri from Yankton, S. D. to St. Louis to determine its suitability for further development.

## Reductions and Diversions Take Away $20,714,300 from Ohio Highway Department in Four Year Period

ESTIMATED grand total of $20,714,300 in revenues was lost to the Ohio State Highway Department's maintenance and construction funds for the four year period including—1931, 1932, 1933 and 1934—through diversions of gasoline tax money or decreases in percentage allocations of the state's share of motor vehicle registration revenues.

The estimate conservatively made by the accounting bureau of the Highway Department does not include actual losses sustained due to decreased consumption of gasoline or decreased auto registrations. Estimates for the year 1934 reflect conservative increases in yields in line with the present upward trend in general business conditions.

The state will be granted approximately $15,500,000 this year in the Federal grant for highway construction under the National Industrial Recovery provisions. This Federal grant must be used for new construction, road improvements, grade separations and bridges and is not applicable for the routine maintenance operations that the Highway Department must finance and continue in the interests of preservation of the state's net-work of roads.

The Pfeiffer Act repealing ½ cent of the gas tax for the construction fund and ½ cent of the tax for the maintenance fund is estimated to take away over $3,000,000 from the construction fund for the balance of 1933 and 1934 and about $2,700,000 from the maintenance fund for the same period. This totals $5,700,000 in losses to the highway department through the Pfeiffer bill.

Total of $3,500,000 "loaned" from highway funds to the state's general fund is not included in the calculation of losses as this money is to be repaid before December 31, 1933.

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## Shots From the Firing Line—*Continued*

### Rocky Mountain States Program $106,000,000 for Highway Construction Under N.R.A.

By PAUL G. FRIGGENS

HIGHWAY construction programs involving more than $106,000,000 are about to be launched in 14 states of the Rocky Mountain region with funds provided by the Federal Government under the National Recovery Act.

Individual programs have been completed and submitted to the Secretary of the Interior Ickes by most of the states. Tentative approval of the programs has been indicated in some cases and dates for the receipts of the bids set as early as August 10th.

Allotments to these 14 states are: Arizona, $5,211,960; Kansas, $10,089,604; Colorado, $6,874,530; Nebraska, $7,828,961; Idaho, $4,486,249; Montana, $7,439,748; Nevada, $4,545,917; New Mexico, $5,792,935; North Dakota, $5,804,448; Oklahoma, $9,216,798; South Dakota, $6,001,479; Utah, $4,194,708; Wyoming, $4,501,325; Texas, $24,244,024.

### China

**Floods on the Yangtze** during the latter part of June rose at the rate of one foot per day until the water was a foot higher than any dikes existing two years ago. 7,000 miles of new dikes built last year stood safely, however, their tops four feet above the flood. These were built by hand by hundreds of thousands of coolies under the guidance of Sir John Hope Simpson, Director General of Flood Relief.

During the building of these levees 1,400,000 Chinese sweated at the huge task. Enough dirt was moved to "put a dike six feet high and six feet thick around the earth at the equator" according to Director General Simpson. The material was piled up and then packed with heavy wooden tamps wielded by six men.

During the floods, when seepage threatened the dikes the Yangtze River Commission rushed gangs of coolies to plug the holes with mattresses of woven reeds. At points of danger soldiers rounded-up every coolie they could catch and kept them working day and night under bayonet guard.

The serious danger may be better realized when one remembers that in 1931 the Yangtze or "Long Dragon" flooded 10,000,000 Chinese from their homes and drowned 140,000 of them. This in addition to causing crop damage responsible for the following famine creating the greatest disaster of modern times.

### New England Notes

By E. D. COOGAN

**D. Arrigoni** has finished the concrete pavement on his job in Berlin, Connecticut and has commenced laying pavement in Seymour. It is interesting to note that he dismantled his complete plant in Berlin and had it set up and operating three days later in Seymour, 40 miles away. D. Arrigoni's work is carried on under the able supervision of C. J. Arrigoni assisted by his two brothers.

**Osborn-Barnes** are making excellent progress on their job in Sharon, Connecticut. They have two Bucyrus-Erie 41-Bs and two Type B-2 machines on the job.

**The C. & R. Construction Company** has started work on the Barkhamsted Dam for the Hartford Metropolitan District Commission. This work was recently awarded to them as low bidders. There are approximately 800,000 cubic yards of earth to be moved; this includes earth excavation, fill, and rock.

**The Edward Balf Company's** job in Willington, Connecticut is nearing completion. They have made excellent time.

**S. W. Lawrence** has just started a job in Eastham, Massachusetts, which was awarded a few weeks ago.

**Arborio Road Construction Company** are working in Farmington, Connecticut. The job is now in full swing and they have made quite an impression on their rock and earth excavation.

**T. J. Connor** is working in Monroe, Connecticut. His Bucyrus-Erie 37-B is giving an excellent account of itself in a heavy rock cut.

**Lee Construction Company** of Boston are constructing the cofferdams for the


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● A background of over 50 years experience in the designing, building and servicing of excavating equipment plus specific experience with many excavators identical with your own in construction and operation, enables Bucyrus-Erie to offer you the right size, type and construction of wire rope for your Bucyrus-Erie, Bucyrus-Monighan or Bucyrus-Armstrong machines. You pay no more for this added value of proven efficiency.

● Even on the same size machines differences in size and grooving of sheaves, drums, rigging, number of bends and digging angles vary considerably the rope requirements. The most efficient rope for a certain make of ¾-yard machine may have a very short life on another ¾-yard of different make. So we suggest to Bucyrus-Erie owners that they place their wire rope orders through Bucyrus-Erie. Shipment will be made promptly. You'll get rope that gives you maximum yardage.

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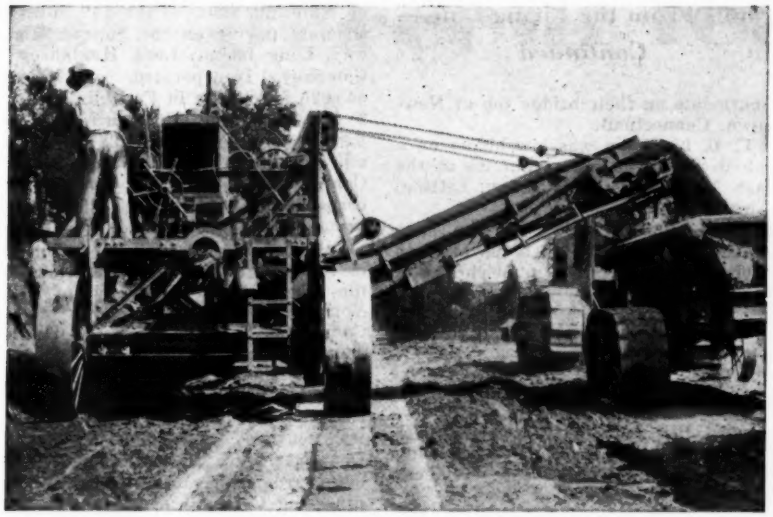

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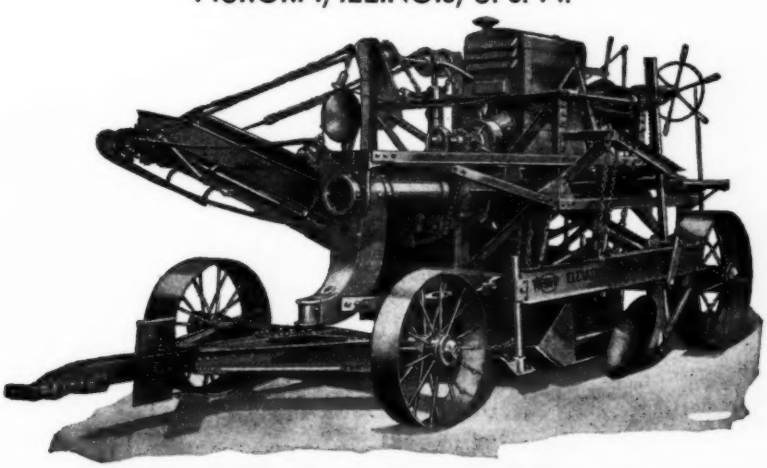

**WESTERN**

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## Shots From the Firing Line— *Continued*

abutments on their bridge job at Newtown, Connecticut.

**C. B. Lindholm** was low bidder on a job in Pittsfield, Massachusetts at the last Massachusetts Highway Letting, August 8th.

**Carlo Bianchi & Company** have moved their four Gas+Air machines to their new highway job in Belchertown. Massachusetts.

### New York Notes

By G. E. PETERSON

Low bidders at the **New York State Highway letting** on July 28th were: **Laurel Hill Construction Company** of Woodside, L. I., $5,520 for furnishing 12,000 yards of topsoil for Queens County; **Louis Longhi & Sons** of Torrington, Connecticut, $76,987 for 1.3 miles of bituminous macadam in Essex County—includes 47,000 yards of excavation; **The J. W. Williams Company** of New York, $285,979 for 5.9 miles concrete in Putnam County—includes 101,000 yards of excavation; **The Erickson Equipment Company** of New York City $42,804 for .25 mile including bridal path and bridge—includes 17,600 yards of excavation.

**Ryan & Davis, Incorporated**, of Long Island City were low bidders at $39,000 for about 4 miles of grading in Delaware County. This company is also doing the excavation for the E. V. McGovern Company on their job at Wingdale.

**The Yonkers Rental Corporation** was low bidder on the Poughkeepsie Water Supply job at $115,000.

**The Good Roads Engineering & Construction Company** of Wantagh submitted low bid for grading of roads and grading around buildings of Brentwood State Hospital at Brentwood, Long Island.

Low bidders for **New York State Highway letting** on August 11th were as follows: **Curtis & Harper, Incorporated** of Newburgh, $150,130 for 2.44 miles of concrete—this job includes 100,220 yards excavation; **Good Roads Engineering & Construction Company** of Wantagh, $304,784 for 3.19 miles of concrete paving on the Sunrise Highway, Long Island; **Lord, Humphrey & Company, Incorporated**, of Malone, $42,625 for bridge in Franklin County; **Syracuse Paving Construction Company** of Syracuse, $178,237 for 6.37 miles concrete in Onandaga County; **Cold Spring Construction Company, Incorporated**, of Akron, $25,703 for bridge job in Steuben County; **Joseph Salustri** of Yonkers, $12,796 for bridge in Chautauqua County; **The Harrington Engineering Company** of New York, $10,355 for bridge in Ulster County at Saugerties; **S. A. Scullen Incorporated** of Cohoes, $245,040 for 5.39 miles concrete in Saratoga County—this job includes 91,000 yards excavation; **W. J. Gallagher** of Medina, $268,260 for 5.14 miles concrete in Genesee County—this job includes 175,385 yards excavation; **Wheeler Engineering Company** of New York $56,807 for bridge in Allegheny County.

### Delaware Notes

Low bidders at the July 19th letting were: 5.7 miles, Todds Chapel-Prospect Church, **George & Lynch** of Dover, $21,207; 3.7 miles, Coverdale X Rd-Smith School, **Old Line Construction Company**, Chestertown, Maryland $9,751; 2.3 miles, Pearson Corner-Pratt's School, **E. Finley Mixner**, Dover, $6,522; 4.037 miles, Holladsville-Maryland line, **George & Lynch**, Dover, $14,266; 6.9 miles, Zoar Camp-Angola, **Highway Engineering and Construction Company**, Selbyville, $20,450; 3.98 miles, Raymonds Neck Road, **George & Lynch**, Dover, $9,459; 4.274 miles Porters-Salem Church, **A. Petrillo & Company**, Wilmington, $25,060.

### North Carolina Notes

By A. W. EDWARDS

Approximately $998,000 worth of **Highway Projects in North Carolina will be Let Soon.** The North Carolina Highway Commission, at this writing, has not set the exact date for the next letting. However, information recently furnished by the State Highway Office is that the date will be during the latter part of August. The following is a list of projects submitted to the Federal Bureau of Roads by the State Highway and Public Works Commission for approval:

Relocation of U.S. No. 17 into Elizabeth City, entailing paving and reworking of brick street over a stretch of about 1½ miles, paving of 5 miles from Raleigh and surface treatment of the remainder of route 21 into Creedmoor (Surface treatment means laying down of a tar and gravel covering.), surface treatment of the road from Seaboard to Jackson, grading and crushed stone surfacing on route 19 from Woodlawn to Wildacres in McDowell county, sand asphalt on 6½ miles from Aberdeen into Richmond county, surface treatment of 2 miles from route 80 into Mocksville in Davie county, surface treatment of 2 miles from Hickory to Brookford.

Surface treatment of about 20 miles on route 200 from Monroe to the South Carolina line, surface treatment of the road from Bath to Bayview in Beaufort county, laying of concrete on the 3½ miles between Norlina and Wise, curb and gutter work on route 86 in Raleigh, grading, topsoil and surface treatment on route 55 in Apex, concrete pavement in Norlina on route 47, asphalt pavement in Pine Bluff on route 7, surface treatment on route 98 in Brookford, surface treatment in Kings Mountain on route 112, surface treatment in Franklin on route 11, structures and surface treatment in Morganton on route 10.

### Ohio Notes

**Skilled laborers on national recovery highway projects** in Ohio will be paid at a minimum rate of 60 cents an hour and upward, according to an agreement between O. W. Merrell, state highway director, and officials of the U. S. bureau of public roads.

The 60-cent scale will prevail in all counties of the state except for a minimum rate of 70 cents in Belmont, Butler, Franklin, Jefferson, Lake, Lorain, Montgomery, Stark, Summit and Trumbull counties; a minimum rate of 80 cents in Hamilton, Lucas and Mahoning counties; and a minimum rate of 90 cents in Cuyahoga county.

Skilled laborers will include all persons employed as operators of power-drive equipment other than passenger automobiles and trucks of not more

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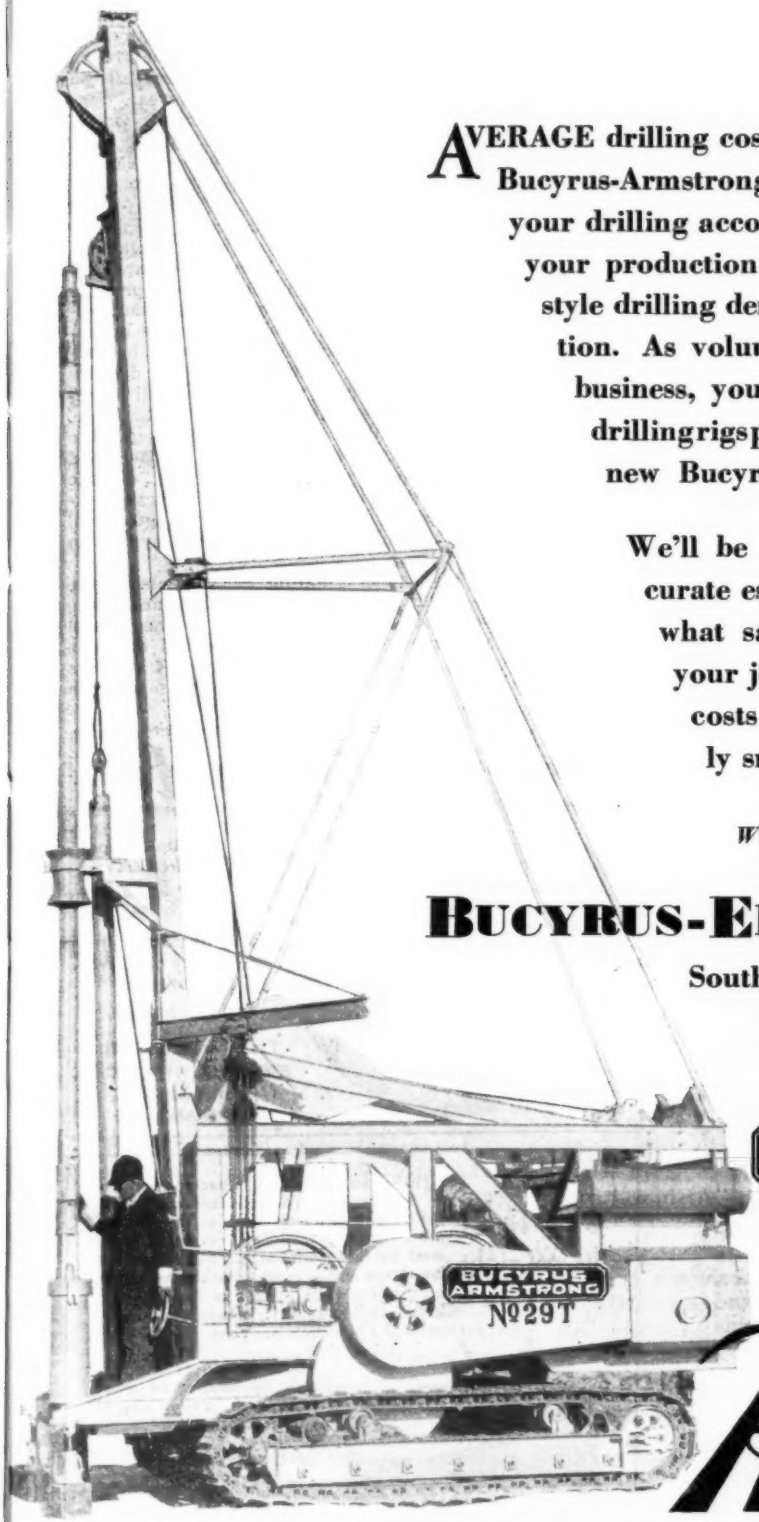


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## Shots From the Firing Line—*Continued*

than 1½ tons rated capacity, carpenters, masons, blacksmiths, mechanics and all other persons skilled in particular trades. Any sub-contractor who operates equipment or who works with the tools of any trade shall be considered a skilled laborer for the time engaged in such work.

Unskilled labor will receive a minimum pay of 40 cents an hour and upward in all counties with the exception of a minimum scale of 47½ cents in Belmont, Butler, Franklin, Jefferson, Lake, Lorain, Montgomery, Stark, Summit and Trumbull counties; a minimum scale of 52½ cents in Hamilton, Lucas and Mahoning counties; and a minimum scale of 60 cents in Cuyahoga county.

Watchmen, guards, water-boys, etc., shall be considered as unskilled labor.

Both skilled and unskilled labor shall not be permitted to work more than 30 hours in any one week, except that working time lost because of inclement weather or shutdowns during the period of employment in any one week may be made up during the succeeding week or weeks of any one calendar month. This limitation, however, shall not apply to the operators of the following types of equipment, viz., power shovels, power cranes, concrete paving mixers and dredging machinery nor to skilled labor engaged in the following classes of work where exceptional skill is required to secure uniformly smooth road surfaces, namely, master concrete finishers, master form-setters and blade grader operators for bituminous surfaces and on bases for such surfaces, unless skilled labor qualified to perform such duties can be obtained from the employment lists furnished by the designated employment agency. However, employment for such classes of skilled labor shall in all cases be limited to not more than eight hours in any one day and not more than 40 hours in any one week.

Time lost in one calendar month will not be permitted to be made up in the succeeding calendar month. The first seven days of each calendar month shall be considered the first weekly period for that calendar month.

Executives or administrative employes are exempt for the requirements for wages, hours of employment and conditions of employment. Contractors, superintendents, timekeepers, book-keepers, clerical employes, storekeepers or other office employes in a position of special trust and responsibility shall be classified as executive or administrative employes.

Supervisory employes may also be exempted from the requirements for hours of employment and condition of employment. The supervisory employe so exempted shall receive for the calendar month a minimum wage in amount equal to 200 hours of work at the minimum rate per hour paid for skilled labor. Supervisory employes working on the same schedule as skilled and unskilled labor shall receive a minimum wage equal to the minimum wage paid for skilled labor. Foremen, master mechanics or any employes whose principal duties are to direct the work of others shall be known as supervisory employes.

Executive, administrative or supervisory employes are prohibited from daily performing in part work classed as skilled or unskilled labor.

Through no fault of the former Work Project Development Committee appointed by Governor White and recently disbanded when the State Advisory Board for public works projects in Ohio was established, **original applications for public work jobs aggregating nearly $80,000,000 must be supplemented by information** so detailed and extensive that the plan will be delayed several weeks. Fred I. Rowe, Hicksville, former chairman of the Project Development Committee and temporary acting chairman of the State Advisory Board, believes that excessive "red tape" in Washington will hamper this plan for re-employment in Ohio.

**The first letting of contracts** by the Ohio Highway Department under the national recovery grant by the federal government to the state will be made Aug. 25. There are some 14 projects included in the letting, representing an

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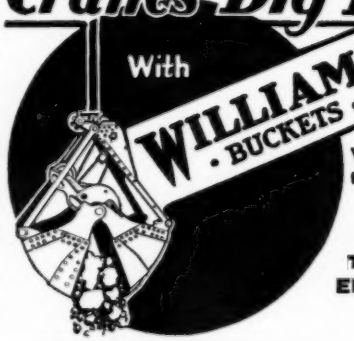

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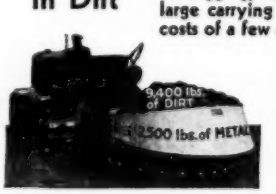


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## Shots From the Firing Line—*Continued*

estimated cost of $1,500,000. O. W. Merrell, highway director, has announced that as soon as the contracts are approved by Washington following the letting he will urge contractors to go "full speed ahead" in order that the benefits of re-employment may be inaugurated immediately. The federal grants necessitate much transmission of plans, specifications and similar data between Columbus and Washington before all the machinery for a project is carried from the "plan" stage to actual employment on the job.

Describing companies fulfilling the requirements of the NRA program as rendering "a real patriotic service", Governor George White has ordered all state departments to **purchase** needed materials and supplies **only from concerns conforming to NRA regulations.**

### Michigan Notes

By CLYDE B. DAVIS

Don Kennedy, business administrator for the state highway department, says that **bids are to be asked soon on 22 Upper Peninsula highway projects,** and Highway Commissioner Murray D. Van Wagoner agreed that the Upper Peninsula should be the first part of the state to benefit from actual work under the national public works program.

The department now is ready to recommend 70 projects in the state, involving an expenditure of $5,500,000. These are on Federal routes, outside the cities, and preliminary work would not be delayed.

**The U. S. Engineer's** office, Duluth, is taking bids for dredging 395,000 cubic yards from Presque Island Harbor, Marquette (Mich.) Bay, and for dredging 173,000 cubic yards from Marquette Harbor.

Favored by good weather, **Luedtke Engineering Company** should complete its work on the Manistee breakwater and pier at least two weeks ahead of the contract date early in September, E. R. Luedtke said. A crew of 50 men is at work on the harbor improvement, which is costing $65,000.

**Stuart M. Weaver,** city engineer at Monroe, under instructions is making a survey of Plum Creek within the city, looking to its being thoroughly cleaned.

**The Lyons Dredging Company** has filled in a site at Muskegon for the 150x200-feet market building of the West Michigan Dock & Market Corp. Three other structures are to be built this year for the corporation on filled-in land.

**Kalamazoo's public works program** has been revised and will cost $1,020,000 instead of $880,000. This includes $150,000 grade separations, flood control and reclamation of low lands at $80,000, $10,000 sewage plant landscaping and $40,000 field house and swimming pool.

#### HUGH McLEAN

Hugh McLean, Detroit, president in 1929 and 1930 of the Municipal Contractors' Association and prominent in the Association of General Contractors for 10 years, died July 30 following an automobile accident. He was 54 years old. In 1929 as president of the Oakwood Construction Company, he won the Noble cup for the best accident-prevention record among public works contractors in the United States.

All of the **curves and dangerous corners are to be eliminated** from the Lansing-Pontiac highway, specifications calling for a 36-foot grade and 100-foot right-of-way. Surveys are being made for the road. The concrete pavement will be 20 feet wide.

**The Otis Construction Company** has been awarded the $3,244 contract for grading and paving of Blackmoor avenue in Detroit.

**Nine bridge contracts** totaling $55,000 were awarded August 2 by the state board's highway committee, of which the most important is the $13,644 crossing over the Grand Trunk railway on M114 near Grand Rapids, to the **R. C. Mahon Company,** Detroit.

Plans for the $50,000 street drainage, bridges, etc., work at Roscommon are being prepared by George H. Ruhling & Co., Detroit.


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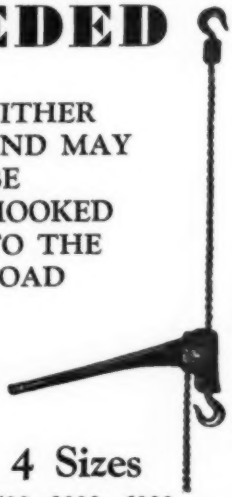

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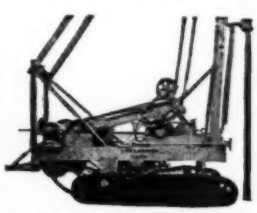

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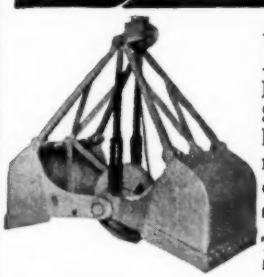

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## Shots From the Firing Line—*Continued*

### Indiana Notes

By DAVID I. DAY

The largest recent contract let by Indiana highway authorities covers Project F.A.E. 279 CD running from east of Cato, a little village in Pike County, to Jasper, county seat of Dubois County, a distance of 9.166 miles. The new highway will be of concrete. **Wilmore Paving Company** of Middletown, Ohio, has the work at a contract price of $186,852.

Other road jobs are a 3-mile stretch on State Road 12 near Michigan City awarded to A. C. **Proudfoot Construction Company**, Hammond, at $67,659; a road 5.2 miles long between Crown Point and the Illinois line in Lake County now being built by **Gast Construction Company** of Warsaw at $143,238; and a short mileage of .961 miles in Alexandria, Madison County, in charge of **McCoun Construction Company** of Noblesville. All three are concrete construction and were awarded at figures substantially less than the engineers' estimates.

The only bridge contract let by the State Highway Commission in recent weeks that exceeded $25,000 was in Laporte County. **Howard E. Stroh** of Auburn was awarded this work at $30,571.

**Strong pressure is being exerted** to have State Highway 64 from New Albany to Jasper rebuilt this year as an employment move. A delegation of Southern Indiana leaders held a conference upon the subject with the state road authorities in Indianapolis, August 9.

### Kentucky Notes

By D. C. BROOKS

**The Highway Commission** at its meeting July 26th appointed W. O. Snyder Chief Engineer at a salary of $4000 per year. This step was taken to comply with regulations of the Bureau of Public Works. The Bureau had informed the Commission that it must meet certain requirements in order to obtain the 7½ million highway appropriation due Kentucky from the 400 million highway appropriation. The department had been without a chief engineer since the resignation of H. D. Palmore who became City Manager of Covington, Ky. about two years ago. Mr. Snyder has been with the department since 1920 having filled the positions of draftsman, chief draftsman and office engineer.

**Plans are going forward** for the first letting of highway work under the N. R. A. for September 12th. No announcement of the actual projects to be included in this letting has yet been made.

### Tennessee Notes

The preliminary draft of the **plans for the proposed Cove Creek Dam,** to be called Norris Dam after Senator Norris, have been completed by the St. Louis office of the War Department. These preliminary plans have been transmitted to the Denver office of the Reclamation Bureau for review. The Tennessee Valley Authority in whose charge this construction will be carried on is making use of the service of John L. Savage, chief designer of the Boulder and Madden dams and Sherman M. Woodward, professor of hydraulic engineering at Iowa State University and for 25 years consultant on many big projects of this nature, in bringing these plans in their final form.

Preparatory work in the vicinity of the site is now being carried on by a force of some 300 men who are engaged in surveying land, estimating the cost of rail and road connections, investigating the caves in the vicinity, looking into land prices, and doing other preliminary work. Tentative date set for the beginning of the actual construction of Cove Creek dam is set for January 1, 1934. It is probable that contracts will be let prior to that date for railway and highway work required.

Dr. Harcourt A. Morgan, Authority director, has established offices at Knoxville as a base of operations for supervising the work at Cove Creek which is some 20 miles northwest of Knoxville by air line. General headquarters for the entire valley development will be located in the vicinity of Muscle Shoals as soon as suitable accommodation can be arranged.

By W. BURR CULLOM

**Foster and Creighton Company** of Nashville has just completed a basement job that required a 50 by 200-foot excavation under a wing of the Jarman (Friendly Five) Shoe Company. The work was carried on without mishap or interruption to factory schedules.

The building, covering almost a city block, is a two-story brick structure, resting on concrete piers and foundations of native stone. The work was carried on under the wing that housed the heavy, vibrating machinery of the heeling and soling departments.

Starting at one end of the already existing ten-foot basement digging was carried on by hand behind heavy tarpaulins, suspended from the ceiling to exclude dust from the factory. A trench was first dug to the center of the job. At that point a large space was cleared to make room for a 50 foot Barber-Greene belt conveyor. Another trench was run from this center space to and through an end foundation wall. The belt conveyor extended along this trench and projected through the hole in the foundation so as to dump directly into trucks on the outside.

Sufficient clay was left at the foundations and around the piers to prevent cave-ins. As the work progressed, the floor was shored up, wooden pillars installed and the concrete piers broken up with air drills operated by an Ingersoll-Rand compressor. The old stone foundation walls were replaced with concrete, the first sections installed being four feet wide and two feet thick directly under the pilas-

ters of the building. Between these sections a four inch wall was poured. Concrete floors were laid as rapidly as the excavation work permitted, and close behind the concrete crew followed the machinery installers. The entire job required 15 men two months to complete. It was directed by W. B. Seagraves engineer and J. H. Yates, foreman for the Foster and Creighton Company.

## Illinois Notes

GRANT ("JACK") HOLMES

A cerebral hemhorrage and paralytic stroke proved fatal to Grant Holmes (age 68) President and Secretary of Robert Holmes and Brothers, Incorporated of Danville, Illinois on July 3rd. Mr. Holmes, who came to Danville in 1892 from Marion, Ohio had served as President of his well known foundry firm for the past ten years although he has been virtually retired since 1930. He was also connected with the Kehota Mining Company. For a number of years he was general foreman of the Marion Steam Shovel Works before going to Danville in 1892. He was the inventor of a number of developments in mining machinery, one of these being the hydraulic jack used on the large Marion strippers. Another of his inventions was an automatic car control and a recently patented mine cage appliance. He was a member of the American Mining Engineers and the Canadian Institute of Mining Engineers as well as fraternal and local associations. Mr. Holmes will be mourned by his many friends throughout the Illinois mining field and the excavating industry at large.

## St. Louis and Vicinity

By A. J. KOENIG

**The St. Louis County Court** has asked for bids for a bridge over Missouri Pacific tracks on Ballas Road. The plans call for 70-foot I-beams with concrete abutments and wood floor.

**Work has been started** on three highway projects in Madison County, Illinois. This work was held up pending the settlement of the cement situation. However, the contractors received permission to purchase cement direct from St. Louis and Hannibal, Missouri. **Jos. Kesl & Sons** are working on the Granite City-Stallings road; **Madison Construction Company** on Marine-Edwardsville road; **Stocker Construction Company** has contract for Binney Bridge.

**Peter Simons Sons** were awarded contract for 4 miles of nine-foot paving in Mason County. **E. D. Otto** has contract for 1.66 miles paving in Wheaton; **O'Connor Construction Company** have contract for 1.5 miles concrete paving in Sangamon County, Illinois.

**E. Gallagher** on a bid of $22,007 was awarded contract for 3.05 miles traffic bound macadam road in Joe Daviess County.

**The Board of Public Utilities,** Kansas City, Kans., plan the construction of Municipal Light and Power underground transmission lines. Estimated cost $500,000.

**The Kansas City Bridge Company** has contract for the construction of a bridge over the Missouri River at Kansas City. They also have contract for the construction of three 80-foot girder bridge across the Little River in Arkansas for the Kansas City Southern R. R.

**E. L. Martin,** Dallas, has contract for the construction of substructure of underpass on state highway 3A. Awarded by M. K. & T. Ry.

E. L. Crugar, Chief Engineer, Wabash R. R., let contract to the **Walsh Construction Company** for the construction of a bridge in Chariton County, Missouri.

**The Board of Public Works,** Washington, D. C., allotted $11,500,000 for a nine-foot channel in the upper Mississippi River. This allottment was made to carry forward work already started and will keep the project moving for a year. Between three and four years will be required to complete the project, the total cost of which may reach $124,000,000.

**Cape Girardeau County** will soon take bids for grading and graveling 28.5 miles of highway. Estimated cost $190,000.


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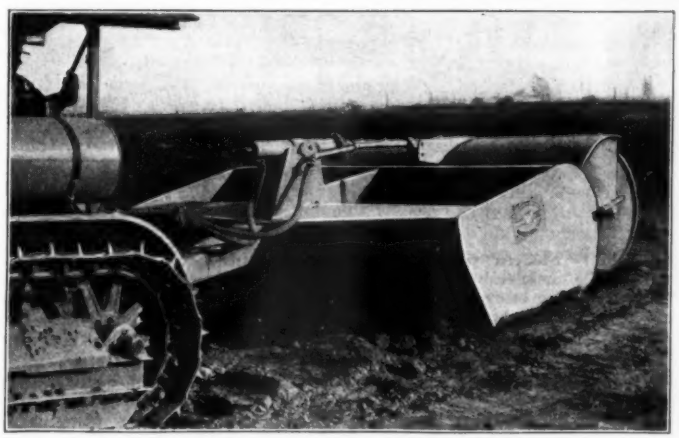

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## Shots From the Firing Line—
### *Continued*

**A. J. Shanks** has contract for surfacing 5.7 miles in Kankakee, Illinois.

The U. S. Engineers, St. Louis, plan 700,000 cubic yards earth work in Crane Creek Levee District and 35,000 cubic yards in Big Swan Levee District on Illinois River.

Elgin, Joliet & Eastern Railroad awarded contract for substructure and single track bridge with lift span over Illinois Waterway to **Walsh Construction Company.**

### River Notes

**Vicksburg took bids August 23rd** on 1,045,000 yards of new levee on the west bank of the Mississippi about 4 miles south of Lake Providence, Louisiana, and on August 22nd on 7 sections totaling 3,821,000 yards 4 miles east of Sondheimer. The contracts are contingent on appropriation of the necessary funds. Completion is required by December 1st on all except two items totaling 1,341,000 yards which is set for 400 calendar days. Originally bids were asked two ways, under NRA restrictions and those for use of regular funds. However, wire instructions were received from Washington by Major Kittrell to readvertise the jobs on the basis of use of regular funds but providing that "hours of labor, pay and conditions of employment shall be in accordance with the Code of the industry doing the work." As the Flood Control Contractors have not, at this writing, received approval of their code this makes bidding rather a problem. All concerned are trying to obtain action on the new code.

**Memphis has received instructions NOT to readvertise** until notified the 5,843,000 yards scheduled for the Upper Yazoo Levee District which was to have been bid August 5th. Major Hoge believes it possible to undertake the work up to September 15th and complete it before high water shuts down operations.

**Lack of allocation of flood control funds** made it necessary for the U. S. Engineers Offices at Memphis, Vicksburg and New Orleans to lay off more than 3,000 employees, reducing their monthly payrolls some $400,000 per month.

**Henry Hughey Company,** Incorporated, of Memphis, was low with 16.9 cents a yard on 48,000 yards near Morrilton, Arkansas, in Conway County Levee District No. 7.

**Sam V. Fink** of West Monroe, Louisiana, secured 55,000 yards on the left bank of the Red River in Orton Levee District, Arkansas.

**Callahan-Walker Construction Company** and **H. E. Culbertson** of Omaha, bidding together, were low on the combined sections totaling 3,821,000 yards at the Vicksburg bidding August 22nd. They bid 17.2 on two items, 21 cents on one, and 21.7 on the other four.

**E. E. Morgan** of Jackson, Mississippi, put in the low combination bid August 22nd at Memphis for three sections in Craighead County, Arkansas totaling 105,000 yards. Mr. Morgan bid 15.47 cents on "all or none" and was closely followed by L. E. Harris of West Memphis at 15.49 and W. B. Whitney of St. Charles, Missouri at 15.6.

### Mississippi Notes

Following low bids were received by State Highway Department: **Martin Wunderlich,** Jefferson City, Missouri, for the construction of 8.6 miles of road; **R. B. Potashnicle,** Cape Girardeau, Missouri, 8.5 miles, also for 5.6 miles; **S. L. Bates,** Wiggins, 6 miles; **Newsom Brothers,** Columbia, for creosoted timber bridge and other bridges.

### Arkansas Notes
By ERNEST W. FAIR

Plans are being made for the construction of a **new bridge and river-straightening work** near Mountain View which will remedy several hazards along the White River.

**M. O. Weaver** of Iowa Falls, Iowa, has begun work on a new road near Still Spring known as the Buffalo River-Leslie job.

A housing shortage resulted at Horatio upon the arrival of 50 men to go

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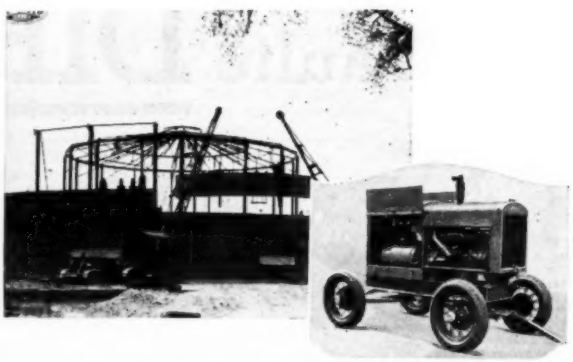

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to work on the Kansas City Bridge Company's rebuilding of the Kansas City Southern railway bridge near there. With all excavating and foundation work completed the bridge will require from three to four months to complete.

**The Fort Smith City Commission** is planning a dam on Lee Creek to supply water for that city.

## Oklahoma Notes

Low bids were received for the State Highway work as follows: for grading, **Merveldt & Poole**, El Reno, 7.642 miles road, and 7 bridges; **Moran & Buchner**, Muskogee, 5.564 miles grading and paving; **Dan Sweeney**, Oklahoma City, 6.252 miles grading and three bridges.

By ERNEST W. FAIR

The Enid Chamber of Commerce has indorsed a **proposal to convert the Great Salt Plains** of Alfalfa county into a 50,000 acre lake under the national recovery act. The dam would be on the Salt Fork river. All land is owned by the government and the area has been designated as a federal game preserve. It will be one fine excavating job if the plan goes through.

A new firm, **Laws Construction Company**, has been incorporated with J. Will Laws, Glenn D. Laws and Ruth E. Laws, all of Oklahoma City, as incorporators.

**Joe Bavousett** of Fort Worth, excavating contractor for more than 40 years, has taken out a patent on a drag pan conveyor which he believes will be of immense value in the future. His conveyor is pan shaped, 6 feet long, 2 feet wide and six inches deep.

**The Western Paving Company** and **Lyons Construction Company** have been awarded street repair work in Oklahoma City. The work will include some excavating projects.

**The Morgan Construction Company** of Oklahoma City is rapidly finishing work on the new barracks and field jobs at Fort Sill, L. E. Scott, manager, is extremely optimistic about work in the southwest, predicting one of the best years of the firm's business to date. This company is also planning work for Leader Industries, Inc. at Bolivar, New York.

**City Engineer H. G. Freehauf** of Miami, Oklahoma, has announced that work on a $3,900 repair job for the Lake Miami dam is to be let immediately. Considerable repair work to the wall itself and additional work on the river banks are also scheduled.

**Road construction and repair work** near the Holdenville dam have also started.

The state recently let 11 contracts totaling $420,771 on state highway projects some of which will entail excavating work. This work includes construction of drainage projects in Grant county, drainage and bridge in Harper county, drainage and bridge work in McIntosh county, drainage and bridge work in Pawnee county and drainage work in Woods County. **Dan Sweeney**, Oklahoma City; **Roberts and Fisher** of Norman; **A. L. Cook** of Ottawa, Kansas; **Merveldt and Poole** of El Reno; **The Sherman Company** of Oklahoma City; **Moran and Buckner** of Muskogee; **E. G. Fike and Son** of Tulsa; **Gaines Brothers** of Miami are contractors receiving the awards.

**An $8,400,000 dam and reservoir** on the North Canadian River is being planned as a flood control measure and auxiliary water supply for Oklahoma City and other municipalities.

Work by **Leo Sanders** on North Canadian river straightening and other similar projects near Oklahoma City have been completed. A total of $425,283 was spent on the project.

J. H. MAXWELL

J. H. Maxwell, 63 years old, former contractor who spent more than 16 years in business at Tulsa, was buried there August 9th, after death from brights disease. Mr. Maxwell had been a road builder in Indiana, Kansas and Oklahoma for 25 years. He came to Tulsa in 1917. His last job was completion of excavation work for the state highway near Jennings and Cleveland, in Oklahoma. He was a member of the Chamber of Commerce and is survived by his widow, a daughter and a son.

## Texas Notes

**Engineer Roy Edwards**, long known as "Rambling Roy from Smoky City," has purchased and taken over the active management of the largest service station in Edcouch, located on the Southern tip of Texas, where he invites all passing shovel and dragline runners to call and see him.

**Hannah & Hall**, Waco, tentatively awarded contract, pending Federal approval, for 16.282 miles of grading and drainage structures.

## South Dakota Notes

By PAUL G. FRIGGENS

**South Dakota has met** with considerable difficulty in arriving at a satisfactory road program with demands from the various counties totaling five or six times the $6,000,000 allotment provided for this State. Actual letting of contracts is not expected until some time after the first of September.

Gold—the lure of countless millions and the bugbear of the London economic conference—**attracted more persons to the Black Hills** for prospecting the first six months of 1933 than had been known here for any one period since the early "boom" in '76. So numerous have become the prospectors, both individual and as companies, that the office of the state geologist at Vermillion, has been forced to issue a bulletin outlining proper methods of placer mining, and cities and towns in the Hills have had to issue warnings against stream pollution.

A survey of mining developments for the first six months of the new year, indicates unprecedented development in placer mining with expansion also marked in hard rock mining, this latter reference meaning the Homestake in Lead where $2,000,000 is being spent in the driving to sea-level of a 5,000 foot shaft.

Varied returns have been reported with some individual placers just "paying out" and other companies making as high as $750 in an eight-hour shift as power shovels scoop "pay dirt" from historic old creek beds deep in the Black Hills.

In Spearfish canyon the **Bear Creek Mining Company** has developed and installed a new type placer machine (illustrated) which has been recovering the past two weeks an average of $1.10 per yard. Larger companies in the placer field include Peerless Mining Company, Grand Hills Mining Company, Eureka Company, The Golden Arrow Mines Company, Bear Creek Mining Company, and the Mills Bros. There are also new developments in tin and feldspar mining. A new mineral, seisum lepidomanline, has been identified in the Hills by the U. S. Bureau of Mines.

## Montana Notes

By PAUL G. FRIGGENS

A preliminary **statement of projects for Montana N.R.A. highways** was approved July 14th and a detailed plan for the projects was submitted July 20th. The partial list includes work costing $3,783,000 or about one-half of the State's total allotment.

## Wyoming Notes

By PAUL G. FRIGGENS

**The Wyoming Highway Department** opened bids August 10th on 16 N.R.A. highway projects, in a schedule for early lettings 14 additional projects, in all totaling $1,000,000. These projects will utilize about one-fourth of the total funds alloted to the state. Contracts for six of the 16 projects were awarded. These involve an expenditure of $355,691. On ten projects all bids were rejected as the Highway Department considered them out of line with estimates. These will be advertised again, the new bids to be considered on the August 29th meeting. It is also hoped that the Federal Bureau of Roads will approve additional projects in time for including at the same bidding.

Wyoming roads to be developed by the Bureau of Public Roads with N.R.A. park and forest highway funds are the Buffalo-Tensleep, $80,000; Hoback Canyon, $64,000; Teton Highway, $15,000; Centennial-Saratoga, $15,000; and Wind River, $100,000.

## Shots From the Firing Line—*Continued*

### Colorado Notes

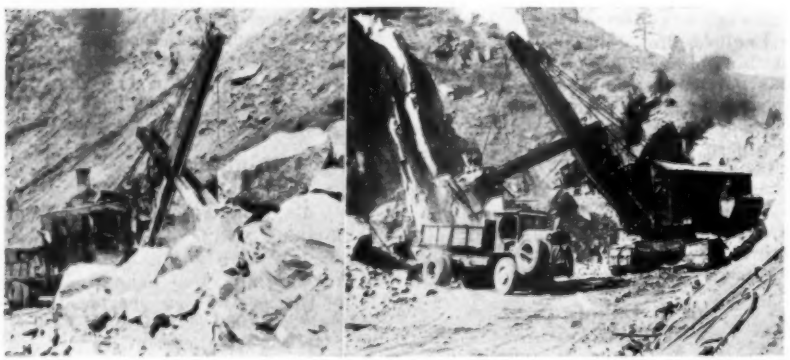
By PAUL G. FRIGGENS

**The allocation program for Colorado's N.R.A. highways** was submitted July 15th. State Highway officials are hopeful of obtaining early approval and permission from the Government to cut the period of advertising for bids in order to speed up placing of the work.

**U. S. Bureau of Public Roads** is spending $400,000 for special forest and park highway projects in Colorado and it is possible that an additional sum of $832,000 will be spent if Washington approves additional appropriations for this purpose. The Colorado forest highways, advertised and the estimated cost are: Berthoud Pass, $48,000; Loveland-Fremont Pass, $24,000; Six Mile Creek, $40,000; Jarre Canyon, $20,000 Mount Evans, $20,000; Pagosa-Chama, $84,000; and Boulder-Central City, $85,000.

By J. F. AMIDON

These photographs were made in famous Ute Pass, Manitou, Colorado, Federal Aid project No. 158-A, High-



way 40S. 300,000 cubic yards of rock and earth were moved to make a once famous Indian trail into a modern highway. This was a very difficult piece of road building. Strong and dependable machinery, with dynamite as an aid, made it possible for the contractors, **Hamilton and Gleason,** of Denver to complete this 4.062 miles of road in four months.

Bucyrus-Erie 30-B and 50-B shovels were used for the major part of the excavation. The accompanying illustrations of these shovels in action, tell very clearly why approximately 100 tons of dynamite were used to loosen the cliffs of solid granite so it could be handled by the shovels.

### Utah Notes

**Morrison-Knudsen Company** of Salt Lake City, was low on a surfacing job of 23.4 miles; **Olaf Nelson** of Logan on 29 miles; **Christenson-Gardner, Inc.** of Salt Lake City on 10.9 miles; **Northwest Engineering Company** of Rapid City, S. D. on 18.3 miles.

### New Mexico Notes

**Proposals will be received** August 22nd at the office of the State Highway Engineer, Santa Fe, for the construction of National Recovery Highway Project 114-D in Guadalupe County, located on U. S. Highway No. 54 between Cuervo and Newkirk. The approximate length is 8.8 miles. The proposed work consists of grading, drainage structures, and crushed base course surfacing. This contract must be completed in 175 weather working days.

By PAUL G. FRIGGENS

Plans have been made for the **organization of a conservancy district project** embracing 10,000 acres on the Rio Puerco south of Belen, according to Capt. W. C. Reid, representative for land owners in the area. Engineering specifications for the proposed district have been completed and an application for an allotment of $570,000 under the Public Works bill may be made. At one time included in the Middle Rio Grande Conservancy project, the proposed district was later abandoned when final plans for the Rio Grande project were trimmed to cut the total cost.

In New Mexico the N.R.A. park and forest highway program will consist of the Navajo Canyon road $68,000; Holman-Taos, $80,000; Cedro Canyon, $20,000; James Canyon, $20,000; Rio Penasco, $50,000; Riudosa North, $5,000.

### California Notes

**J. W. Huffman,** Merced, who operates a gravel pit resorted to advertising in order to discourage thieves from stealing the gasoline from his crane. There appeared in a local paper the following ten-inch display advertisement.

> "Parties stealing gas from crane at gravel pit please use wrench under seat to take pipes off gas tank instead of breaking them, and wear tin pants for as sure as hell you will receive bonus of buck shot."

Our correspondent did not inform us as to the effectiveness of this "burglar insurance" but we have a hunch that it worked satisfactorily.

By H. L. LIVINGSTON

**Granfield, Farrar & Carlin,** San Francisco, have been awarded contract for grading 4.26 miles of the Douglas City-Peanut National Forest Highway in Trinity County. Their bid was $98,131, the principal amount of work being 257,200 cubic yards of unclassified excavation. They are moving their two Lorain 75-B's to this job. John Carlin will be Superintendent.

**Hemstreet & Bell** of Marysville, bid $115,789 and were awarded the contract by the Bureau of Public Roads for grading Section "A", Route 51, of the Hoopa National Forest Highway in Humboldt County. The excavation involved amounts to 370,300 yards. This company has just finished a highway contract adjoining and are in very favorable position to commence operation. This company were awarded by the Bureau of Public Roads at the same time a contract of $47,525 for 13.74 miles of crushed gravel base on the Hoopa Valley Indian Reservation.

**Plans are being completed** and a call for bids will soon be issued by the U. S. Engineer's Office, 751 South Figueroa Street, Los Angeles, for constructing 4,000 feet of breakwater at the Los Angeles, Long Beach outer harbor. Lt. Colonel V. I. Peterson is District Engineer on this project. Bids will be called on alternate proposals as follows:

1. Composite type, using earthen core; 300,000 tons class "A" rock, 320,000 cubic yards class "B" rock, (solid stone measurement exclusive of voids) 455,000 cubic yards earthen core of sanded clay.
2. All rock type using class "B" rock instead of earthen core involving 300,000 tons class "A" rock, 232,000 yards class "B" rock, (solid stone measurement exclusive of voids) 323,000 cubic yards class "C" rock, (solid stone measurement exclusive of voids).

**Call for bids** will soon be issued by the U. S. Engineer's Office, Custom House, San Francisco, for dredging 1,661,191 cubic yards of material for Richmond Harbor.

**The East Bay Municipal Utility District,** 512-16th Street, Oakland, will soon make formal application to the government under the National Industrial Recovery Act for: $4,000,565 for improvements of and extensions to the waterworks system of the district; $5,000,568 for construction of the dam and power plant at Middlebar, Calif.

**Call for bids** will be issued shortly by the U. S. Engineer's Office, California Fruit Building, Sacramento, California, for dredging: 2,531,000 cubic yards from the San Joaquin River between Turner Cut and Criminal Point; 2,706,000 cubic yards in San Joaquin River for a 30-foot channel and 1,881,000 cubic yards between Criminal Point and Suisun Bay; 1,340,000 cubic yards from the Suisun Bay 30-foot channel between Steake Point and Bullshead Point.

**The Orange County Supervisors** have prepared a tentative program of public works totaling approximately $7,000,000. According to Nat. H. Neff, County Superintendent of Roads, the projects are:

Aliso creek dam and reservoir, $111,000 and 9000 man-days.

San Juan dam and reservoir, $1,077,980 and 146,000 man-days.

Santa Ana river diversion, $750,000 and 135,000 man-days.

Break creek dam and reservoir, $760,000 and 73,000 man-days.

Santa Ana river flood protection, $980,000 and 90,000 man-days.

Santiago creek flood control dam and channel, $498,560 and 24,000 man-days.

Newhope Drainage district protection, $2500 and 60 man-days.

Talbert Drainage district protection, $80,000 and 9000 man-days.

Rapid progress is being made by **West Slope Construction Company** on their San Gabriel Dam No. 1 job. In the picture above we see an Allis-Chalmers No. 35 Tractor with LeTourneau bulldozer cleaning up the roadway while the four-yard dipper of the powerful Bucyrus-Erie 120-B electric dumps its load into the huge hopper of a big Mack truck.

Announced August 14th by the **California Highway Commission**, was the **new budget** for the next two years. Work under this program will start on October 1st and during the 21 months that follow, 190 major highway and bridge projects will be let in addition to many smaller contracts. The total program for the remaining 21 months of the biennial, including maintenance, will amount to $59,352,438.

### Pacific Northwest Notes

During the last week of August and the month of September, Pacific Northwest contractors will have an opportunity to bid on **203 major highway contracts** estimated to total $20,198,354. These included in August, a half million dollars for the road projects in Idaho, some two and one-quarter million in Montana and close to one and one-quarter million in Oregon with a little over a million for the state of Washington. The U. S. Bureau of Public Roads also let during August a $63,000 job in Idaho, and two others totaling about a $100,000. During September the state of Washington will let road projects totalling about $1,600,000; Oregon $1,800,000; Montana about $3,000,000; and Idaho $1,750,000. The U. S. Bureau of Public Roads will also hold lettings on forest roads amounting to $1,715,000 for Oregon; $820,000 for Washington; $500,000 for Montana; $542,000 for Idaho; $1,149,000 in Rainier National Park; $590,000 for Crater Lake Park; $1,100,000 for Glacier National Park.

Included in the projects on which the **Oregon State Highway Commission received bids** on August 24th and 25th were: The Dixie-Lime Section of the Old Oregon Trail in Baker County consisting of 4.09 miles grading requiring approximately 204,000 cubic yards of excavation and 27,000 cubic yards of gravel or talus topping; North Fork-Humbug Mountain section of Wolf Creek Highway in Clatsop County with 1.34 miles of grading requiring approximately 257,000 cubic yards of excavation; Odell Lake Section of the Willamette Highway in Klamath County with 4.26 miles of grading and 149,000 cubic yards of excavation; Middle-Fork-Flowers Gulch Section of the Pendleton-John Day Highway in Grant County with 345,000 cubic yards of excavation in 4.86 miles.

All these jobs are National Recovery Highway projects under the usual restrictions. Wages are specified at 65 cents per hour for skilled labor and 55 cents for unskilled labor.

# Book Reviews

**Economics of Highway Improvement**, published March, 1933, by the Portland Cement Association, 33 West Grand Avenue, Chicago, is an 8x11 booklet of 20 pages. It includes tables, formulae, and computations.

This booklet is a technical treatise that highway engineers can apply to their own traffic, construction and maintenance problems and quickly determine where and how to build roads. It summarizes the work of the Highway Research Board in developing the tests and details needed to place road building on a sound business basis. The essential findings of the Committee on The Economics of Highway Improvement are assembled and applied to a practical solution of road building problems.

**Linn Manufacturing Corporation**, Morris, New York, has recently published a new catalog which illustrates and describes the complete Linn line, including several announced refinements in all gas and Diesel powered Linn tractors. A copy of this catalog will be sent free upon request.

**The Portland Cement Association**, 33 W. Grand Ave., Chicago, has recently issued a 16-page illustrated booklet on cement-bound macadam pavement. The distribution is free to those interested.

An eight-page illustrated booklet on **Selecting the Clutch** recently published by Twin Disc Clutch Company, Racine, Wisconsin, may be of interest to our readers. It covers, according to the manufacturer, the various phases to be considered in the correct clutch selection for any type of machine where power must be transmitted. A copy will be sent to any reader upon application.

A recent 4-page bulletin published by Westinghouse Electric and Manufacturing Company of East Pittsburgh, Pennsylvania, illustrates and describes **Rectox Battery Charger.** The construction, application, and operation of the charger are explained in the leaflet pointing out the distinctive features and advantages of this type of dry, non-chemical, metallic oxide rectifier. Copies of the leaflet may be obtained from the advertising department at East Pittsburgh.

**Oxwelding for General Maintenance** is the title of a 16-page, illustrated, booklet describing the use of the oxy-acetylene process of welding and cutting in reclamation of broken and worn machine parts, alteration, fabrication and installation of equipment published by the Linde Air Products Company, 30 East 42nd Street, New York, N. Y. Among the various plant equipment covered are piping, tanks and containers, machine elements, engine and pump parts, frames and conveying equipment. Repair of worn parts by bronze-surfacing and hard-facing is given special consideration. Among the many illustrations is a chart giving thirteen simple tests for identifying the more common metals.

The recently published 4-page illustrated bulletin on the **Yarway-Becker automatic control valve** for compressed air lines will no doubt be of interest to many of our readers. If interested write Yarnall-Waring Company, Chestnut Hill, Philadelphia, Penna.

The second revised edition of the pocket size booklet entitled **Practical Information of the Use and Care of Wire Rope** was recently published by **A. Leschen and Sons Rope Company**, St. Louis, Missouri. This handy 40-page booklet is filled with valuable hints and is available to any interested reader on application. Please mention **Excavating Engineer** when writing.

Among the subjects covered in this booklet are breaking in or setting a new wire rope, kinking, uncoiling or unreeling, lubrication, sudden and bending stresses, alignment, serving or seizing splices, etc.

**National Equipment Corporation**, Milwaukee, Wis., has published a 12-page illustrated bulletin on the Koehring Wheel Dumptor. This attractive two color publication contains action photographs together with close ups showing various parts. The catalog also includes complete specifications. Copy will be sent to anyone interested. Please mention **Excavating Engineer.**

**The Proceedings of the 12th Annual Meeting of the Highway Research Board**, in two volumes, of which the first contains general reports and papers; the second, the final report on the special investigation on the "Use of Calcium Chloride as a Dust Palliative" has recently been published. The price is $2.00 and orders may be sent direct to the **Highway Research Board**, 2101 Constitution Avenue, Washington, D. C.

# EXCAVATING ENGINEER Bargain Counter

★ ★ ★ THE ITEMS LISTED on these pages have been selected because they offer unusual values to the man who is looking for a bargain. Some of this equipment is surplus stock which has never been used, some is rebuilt and carries new equipment guarantee, some is just plain used. But every item is priced for quick sale. If any of this equipment fits your needs send a postcard or letter, mentioning the reference number, to *Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.* We'll pass your inquiry along to the owner and you will receive price and complete information promptly. Act now — with advancing prices on new stock this equipment will move fast.

## SHOVELS-CRANES DRAGLINES

**P&H MODEL 208—45′ BOOM DRAGLINE** Cats—15½′ long, 9′ wide, 22″ Treads. 100 HP. Waukesha High Alt. Engine. SCD-1.

**BUCYRUS-ERIE REBUILT TYPE B HIGH LIFT STEAM SHOVEL.** Excellent condition. Clamshell equipment available. SCD-2.

**AMERICAN 1 CU. YD. GASOLINE SHOVEL.** Motor overhauled 1932. Good value. SCD-3.

**P&H MODEL 600—40′ BOOM CLAMSHELL.** Waukesha 75 HP. Engine. New 1929. Dragline and Shovel equipment also available. SCD-4.

**ORTON ⅝ YD. GASOLINE SHOVEL.** New 1926. Make an offer. SCD-5.

**P&H MODEL 600.** New 1929. 20′ Boom, 14′3″ Dipper Handle, 1 cu. yd. Dipper. Waukesha 75 HP. Engine. Dragline and Clam Shell Equipment also available. SCD-7.

**BUCYRUS-ERIE MODEL 30-B DIESEL—25′9″** Boom, 14′ Dipper Handle, 1 yd. Dipper. SCD-9.

**BAY CITY TRACTOR TYPE—CHAIN CROWD —⅝ YD. SHOVEL.** Cat Mounted. McCormick-Deering Power Unit. Excellent condition. SCD-10.

**OSGOOD "CONQUEROR" GAS—1¼ CU. YD. SHOVEL**—Brand New LeRoi Engine. Clamshell Equipment also available. SCD-18

**MONIGHAN MODEL 1-W. WALKER — 60′** Boom Dragline, 1¼ cu. yd. Page Bucket. Good condition. SCD-13.

**P&H MODEL 600—40′ BOOM DRAGLINE.** Waukesha 75 HP. Engine. New 1929. Shovel and Clamshell Equipment also available. SCD-14.

**BAY CITY TRACTOR TYPE CLAMSHELL.** NEW 1928. Excellent condition. Shovel Equipment also available. SCD-15.

**BUCYRUS-ERIE SLIGHTLY USED-LOAD-MASTER TRACTOR CRANE**—14′ Boom—Rubber tired wheels—Rated lifting capacity 4500 lbs. McCormick-Deering Power Unit—New Machine Guarantee. SCD-17

**OSGOOD "CONQUEROR" GAS—40′ BOOM CLAMSHELL**—Brand New LeRoi Engine. 1¼ cu. yd. Shovel Equipment also available. SCD-19

## COMPLETE FRONT END EQUIPMENT

### *Shovel Equipment*

**¾ CU. YD. DIPPER—23′ BOOM—15′ DIPPER HANDLE**—Extra High Lift Rope Crowd Shovel Equipment suitable for Models 1030 or 1035. Brand New. SE-2.

**¾ CU. YD. DIPPER—23′ BOOM and ENGINE —12′6″ DIPPER HANDLE**—Shovel Equipment suitable for 20-B Steam. Brand New. SE-15.

**¾ CU. YD. DIPPER—26′ BOOM and ENGINE —17′ DIPPER HANDLE**—High Lift Shovel Equipment suitable for 30-B Steam. Brand New. SE-16.

**¾ CU. YD. DIPPER—25′9″ BOOM—14′ DIPPER HANDLE**—Shovel Equipment suitable for 30-B Diesel. Brand New. SE-17.

**⅞ CU. YD. DIPPER—23′ BOOM—15′ DIPPER HANDLE**—High Lift Rope Crowd Shovel Equipment Complete suitable for Model 1030 or 1035. Rebuilt—New Equipment Guarantee. SE-22

**⅞ CU. YD. DIPPER—21′9″ BOOM and ENGINE—15′ DIPPER HANDLE — High Lift** Shovel Equipment. Suitable for 31-B Steam. Brand New. SE-18.

**1 CU. YD. DIPPER—26′ BOOM—15′ DIPPER HANDLE**—Rope Crowd Shovel Equipment suitable for Model D-2. Brand New. SE-3.

**1¼ CU. YD. DIPPER—25′ BOOM—17′ DIPPER HANDLE**—Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-5.

**1½ CU. YD. DIPPER—23′6″ BOOM—15′ DIPPER HANDLE**—Slightly Used Rope Crowd Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-6.

**1½ CU. YD. DIPPER—27′ BOOM—17′ DIPPER HANDLE**—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. Rebuilt—New Equipment Guarantee. SE-23.

### *Clamshell Equipment*

**40′ BOX BOOM CLAMSHELL EQUIPMENT INCLUDING ROPES.** Suitable for Model D-2. Brand New. CS-3.

### *Dragline Equipment*

**35′ CHANNEL BOOM, FAIRLEAD AND ROPES** but not including bucket. For use on Model D-2. DL-2.

**40′ CHANNEL BOOM, FAIRLEAD AND ROPES,** but not including bucket. For use on Model D-2. DL-3.

**40′ BOX BOOM, FAIRLEAD AND ROPES,** but not including bucket. For use on Model D-2. DL-4.

**45′ BOX BOOM, FAIRLEAD AND ROPES,** but not including bucket. For use on Model D-2. DL-5.

**40′ CHANNEL BOOM, FAIRLEAD AND ROPES,** but not including bucket. For Model E-2. Brand New. DL-6.

**45′ CHANNEL BOOM, FAIRLEAD AND ROPES,** but not including bucket. For Model E-2. Brand New. DL-7.

**40′ CHANNEL BOOM, FAIRLEAD AND ROPES,** but not including bucket. For Model 30-B Diesel. Brand New. DL-8.

**45′ CHANNEL BOOM, FAIRLEAD AND ROPES,** but not including bucket. For Model 30-B Diesel. Brand New. DL-9.

**BRAND NEW Ropes included with each of above Dragline Equipments.**

**All of above equipment is BRAND NEW and of BUCYRUS-ERIE manufacture.**

### *Trench Digging Equipment*

**⅝ CU. YD.—36″ WIDE SOLID TYPE DIPPER,** 21′ Boom, and all auxiliary equipment for application to Model 1030. Will dig to maximum depth of 18′. DS-3.

**BRAND NEW PAGE,** two dippers each ⅝ cu. yd., one 38″ wide over cutters, the other 49½″ wide over cutters. 17′1½″ Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

**BRAND NEW Ropes included with each of above Trench Digging Equipments.**

# DIPPERS

## *Small Machines*

**2 ⅝ CU. YD.—Plate.—Will fit 20-B Steam or Gas. Brand New.** D-12

**1 2/3 CU. YD.—Plate front.—Will fit 14-B. Brand New.** D-13

**1 ¾ CU. YD.—Rock type.—Will fit 30-B Gas or Diesel. Brand New.** D-14

**1 ¾ CU. YD.—Rock Type.—Will fit 20-B Steam or Gas. Brand New.** D-15

**4 ¾ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New.** D-16

**1 ¾ CU. YD.—Cast Front Inserted Tooth. Will fit 1030 or 1035. Brand New.** D-17

**2 ⅞ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New.** D-18

**1 ⅞ CU. YD.—Plate Front. Will fit 18-B. Brand New.** D-20

**1 ⅞ CU. YD.—Rock type. Will fit 31-B. Brand New.** D-21

**1 1 CU. YD.—Rock type. Will fit D-2 or 31-B. Slightly Used.** D-22

**1 1¼ CU. YD. INSERTED TOOTH. Will fit GA-2 or GA-3. Slightly Used.** D-25.

**1 1¼ CU. YD.—Plate front. Will fit E-2, 41B or 42-B. Slightly Used.** D-26

**2 1¼ CU. YD.—PLATE FRONT. Will fit E-2. Brand New.** D-27.

**1 1½ CU. YD.—PLATE. Will fit E-2. Brand New.** D-28.

**2 1½ CU. YD.—Manganese Front Inserted Tooth. Will fit E-2, 41-B or 42-B. Slightly Used.** D-29

**1 1½ CU. YD.—Vanderhoef type with Vanderhoef teeth. Will fit E-2 or 42-B. Slightly Used.** D-30

## *Large Machines*

**1 2½ CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on 68-C and 70-C Machines. Brand New.** D-1.

**2 3 CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on Model 100-B, 68-C, 70-C Machines. Brand New.** D-2.

**1 3½ CU. YD.—Front 2¾" Nickel Chrome Steel, two part Van Port Reversible Teeth. Can be used on Model 88-C, 95-C, Class 180. Brand New.** D-3.

**1 4 CU. YD.—Front 2¾" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Has seen some service but in good condition. Can be used on Model 100-C, 120-B.** D-4.

**1 4½ CU. YD.—Lip 2¼" Manganese Steel, two part Reversible Manganese Teeth. Can be used on Model 88-C, 110-C. Brand New.** D-5.

**3 6 CU. YD. Molybdenum Steel Front, Annealed Cast Steel Back, two part Reversible Van Port Teeth. Can be used on 225-B and 320-B. Brand New.** D-11.

**1 8 CU. YD.—Front Molybdenum Steel, two part Van Port Reversible Teeth. Can be used on Model 320-B. Slightly Used but excellent condition.** D-6.

## *Dragline Buckets*

**1 1¾ CU. YD. OMAHA STANDARD. Rebuilt. Approximate weight 3,800 lbs.** DB-7.

**1 2 CU. YD. BUCYRUS-ERIE TYPE "U" RED ARCH. Rebuilt. Approximate weight 3,700 lbs.** DB-6.

**1 2 CU. YD. BUCYRUS-ERIE TYPE "U" RED ARCH. Rebuilt. Approximate weight 3,700 lbs.** DB-8.

**1 2½ CU. YD. BUCYRUS-ERIE INSERTED TOOTH. Rebuilt. Approximate weight 6,500 lbs.** DB-9.

**1 2½ CU. YD. OMAHA STANDARD. Rebuilt. Approximate weight 5,400 lbs.** DB-10.

# BOILERS

**BRAND NEW**

**Will Make That Old Shovel Work Like New.**

***Can Also Be Used for Miscellaneous Service.***

## *Vertical Type*

**9 36"x82½"—26 H.P.—142 lb. Working Pressure. Mass. Std. Will fit Type A.** B-1.

**4 42"x88"—35 H.P.—144 lb. Working Pressure. Mass. Std. Will fit Type B Shovel.** B-2.

**1 44½"x88½" fitted with extended fire box for burning wood. Can be used for coal or coke. 37 H.P.—144 lb. Working Pressure. ASME Std. Can be installed on Type B Shovel.** B-3.

**1 44½"x88½"—37 H.P.—145 lb. Working Pressure. Canadian Std. Will fit Type B Machine.** B-4.

**1 44½"x88½"—37 H. P.—147 lb. Working Pressure. Mass. Std. Will fit any Type B** B-5.

**1 46½"x88½"—37 H.P. 150 lb. Working Pressure. Special Wood Burning. Mass. Std. Will fit any B-2 or B-3 Machine.** B-7.

**2 46½"x88½"—37 H.P.—150 lb. Working Pressure. Mass. Std. Will fit B-2 or B-3** B-8.

**3 46½"x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3** B-9.

**1 48"x7'10"—52 H.P.—150 lb. Working Pressure. Mass. Std. Will fit any 31-B** B-10.

**1 54"x160"—41 H.P.—125 lb. Working Pressure. ASME Std. Will fit B-2 or B-3.** B-11.

**2 58"x7'9"—70 H.P.—150 lb. Working Pressure. Mass. Std. Will fit 42-B Machine.** B-12.

## *Locomotive Type*

**3 44"x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 68-C.** B-13.

**1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C** B-14.

**1 54"x9'7"—70 H.P.—125 lb. Working Pressure. Canadian Std. Will fit Model 50-B Machine.** B-15.

**2 54"x11'3"—92 H.P.—125 lb. Working Pressure. ASME and Mass. Std. Will fit Model 50-B Machine.** B-16.

**1 54"x18'—127 H.P.—140 lb. Working Pressure. ASME Std. Will fit Model 103-C** B-17.

# ELECTRICAL EQUIPMENT

**MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1500 RPM., 90 HP., BRAND NEW.** EE-1.

**50 KW MOTOR-GENERATOR SET—GENERAL ELECTRIC—consisting of 3 phase, 60 cycle, 440 volt, 1170 RPM., 75 HP., Induction Motor connected to 50 KW, 250 volt, 1200 RPM., Generator, including suitable rheostat and compensator. BRAND NEW.** EE-2.

**COMPENSATOR—GENERAL ELECTRIC—75 HP., 2200 volt, 3 phase, 25 cycle, manual type. BRAND NEW.** EE-3.

**TRANSFORMER—GENERAL ELECTRIC — 5-KVA. 2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. BRAND NEW.** EE-4.

**GENERATOR — WESTINGHOUSE — 125 KW, 250 volts, 500 amperes. Direct Current. 440 RPM. Includes two outboard bearings. BRAND NEW.** EE-5.

**MOTORS (2) — GENERAL ELECTRIC — 21.5 H.P. 3 phase, 60 cycle, 440 volt, 900 RPM. Totally enclosed—ball bearing. BRAND NEW.** EE-6.

# LIGHTING PLANTS

**1 1 KW MOON TURBO STEAM GENERATOR for Lighting Plant. 32 Volt. New.** LP-1.

**1 1 KW MOON TURBO STEAM GENERATOR for lighting Plant. 110 Volt. New.** LP-2.

**1 1 KW MOON TURBO STEAM GENERATOR for Lighting Plant. 110 Volt. Used.** LP-3.

**1 1½ KW MOON TURBO STEAM GENERATOR—110 Volt Light Plant. Slightly Used.** LP-5.

# ENGINES

**Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.**

## *Diesel*

**10 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—4 cylinders, 7" bore x 8½" stroke, 75 HP at 600 RPM, 4 cycle, Vertical—valve in head type. Includes radiator, fan, auxiliary air compressor, tank and fittings, fuel tank with pipe and fittings. Also mounted on structural base for portable use.** DE-1.

**2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—5-cylinder, 9" bore x 10½" stroke, 150 HP at 450 RPM, 4 cycle, Vertical—valve in head type. Dust proof, Oil tight crank case and forced lubricating system. Full equipment. Also auxiliary air starting equipment.** DE-2.

**1 REBUILT-BRAND NEW CYLINDERS—120 HP 14"x17" TWO CYLINDER FAIRBANKS-MORSE-DIESEL ENGINE, SPEED 257 R.P.M.—Fuel Tank, Air Tank, Water circulating Pump, Four cylinder starting Engine belted to Compressor and Hand Pump for filling fuel tank included.** DE-4.

**4 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—3-cylinder, 6" bore x 8" stroke, 45 HP. at 650 RPM.** DE-5

**3 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—4-cylinder, 6" bore x 8" stroke, 60 HP. at 650 RPM.** DE-6

## *Steam*

**1 12½"x16" link reversing type for Railroad Shovel.** ME-1.

**2 4½"x5" reversible—20.8 HP at 400 RPM. 100 lb. Pressure.** ME-2.

**1 4¾"x5" reversible—23.2 HP at 400 RPM. 100 lb. Pressure.** ME-3.

**2 5"x5" reversible—25.6 HP at 400 RPM. 100 lb. Pressure.** ME-4.

**1 "LITTLE TUGGER" INGERSOLL RAND STEAM HOIST ENGINE No. 1-H-5-2½ H.P.** ME-5.

# AIR COMPRESSORS

**2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Brand New.** AC-1.

**2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Used. Make offer.** AC-2.

# CAT MOUNTINGS

**Give that Old Wheel Machine New Life**

**1 REBUILT SPUR GEAR CAT MOUNTING—Interchangeable with Type B or Type B-2 Bucyrus-Erie traction wheel or cat mounting.** CM-1.

# PUMPS

**1 NB—3 STAGE CENTRIFUGAL PUMP—2" suction and discharge—bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor.** ME-6.

# A Dragline Adventures out to Sea

(Continued from page 354)

graphs tell the story. With a Union steam hammer turned upside down he tugged away while the hammer drove them up. The tough job was completed in record time.

*This Union hammer was rigged upside down to pull 80-foot sheet piling that had defied other methods.*

He had come across not for the piling job but to backfill behind the walls of the dry dock. Here his long boom was very useful and he rehandled about 30,000 yards in a most efficient manner. He did loyal work around Vancouver and Victoria harbors too where most of the jobs were dipper work and Cyrus served as an auxiliary unit, working where the dipper dredges couldn't get at material above low-watermark handling. Teaming up with one of these dredges must have been something of a reunion, for No. 2, assigned to most of the tough rock jobs on the coast was also a member of the Bucyrus-Erie family. No. 4 the other dredge on these operations was a 4-yard Marion. Cyrus played a leading role on the Fraser River operations where there was a cannery job and a dyking job both requiring long casts.

Like many a good workman before and since old Cyrus was "sold down river" after the Esquimalt job and is now engaged at the prosaic job of stripping coal in Alberta. If any of his present friends read this give him the regards of the Northwestern gang who remember well his faithful part in their achievements.

I am sure he will always cherish as one of the highlights of his career his adventures on the western sea.

# HONEYBROOK—the deepest hard coal strip mine

(Continued from page 357)

mer steel. Only one jack-hammer is needed in the pit, and the compressor also supplies air for this and for the tripod drill. Steel for this latter drill is sharpened in a larger blacksmith shop at the Spring Mountain job.

Directly below the blacksmith shop is the deepest part of the Honeybrook pit—360 feet. Coal has already been removed from this end, and most of the hole has been filled in with rock from the other end of the pit. Honeybrook is not only the deepest strippings in the anthracite field, but the only one from which overburden is removed by means of a plane. Also, this pit holds the record as the oldest in which operations have been carried on continuously. As now worked, at its present 240-foot depth, it is a tribute to the Dick organization that had the genius to select such efficient methods and modern equipment.

# POSITIONS WANTED

**Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.**

***Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin***

### SHOVEL OPERATOR

Three years' experience on Bucyrus-Erie Gas +Air on basement excavating, highway and street grading. Also eight years' experience on Erie, Marion, Bucyrus, steam shovels. Will go anywhere in U. S. A. or Canada. Can do own repairing. A-1 reference. Married. Present location Minnesota. Box 5801.

### HELP WANTED

The United States Civil Service Commission announces open competitive examinations for: Senior Engineer, Engineer, Associate Engineer, Assistant Engineer. Applications must be on file at Washington, D. C., not later than September 28, 1933. The examinations are to fill vacancies occurring in the Federal classified service throughout the United States. Entrance salaries range from $2600 to $5400 a year, less economy deduction of not to exceed 15 per cent and retirement deduction of 3½ per cent. Competitors will not be required to report for a written examination, but will be rated on education and experience. Applicants must have certain specified education and experience in engineering. Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city, or from the United States Civil Service Commission, Washington, D. C.

### DRAGLINE-SHOVEL OPERATOR

10 years' experience on Bucyrus-Erie, Link Belt, Marion and Northwest machines, steam, gasoline and Diesel powered. Have worked on highway and railroad grading, quarry excavation and drainage irrigation. Willing to go anywhere in U. S. A. Also have 2 years' machine shop experience. Can do own repairing and furnish A-1 references. Present location Florida. Box 5702.

### OPERATOR

Ten years experience as shovel, clamshell, backdigger and dragline operator on Osgood, Thew, Bucyrus-Erie, Northwest and Bay City machines. A-1 references. Present location New York State. Box 5902

### SHOVEL OPERATOR

5 years experience on Lorain, Northwest, Osgood, and Bucyrus-Erie Gas, Diesel and steam machines. Can do own repair work. Single and willing to go anywhere in U. S. A. or Foreign countries. Can furnish excellent references. Box 5904

### OPERATOR

With 26 years experience on Monighan, Bucyrus-Erie and other makes on all kinds of projects. Can do own repair work and furnish good references. Willing to go anywhere. Present location Illinois. Box 5905.

### DRAGLINE OPERATOR

25 years experience on steam draglines on construction work. Prefer operating dragline. Can do own repair work. Reliable references furnished. Present location, Indiana. Box 5701.

### WANTED

Position as crane, dragline or shovel operator, gas or steam. Have engineer's License and have operated since 1907. Can operate practically all types. Can furnish excellent references. Present location Texas. Box 5705.

### SUPERINTENDENT

20 years operating and in charge of heavy strip mine and quarry equipment. 45 years of age. Can furnish references from any former employer and the largest manufacturer of excavating equipment in America. Can take full charge on reasonable notice. Box 5901

### EXPERIENCED DRAGLINE OPERATOR

Fifteen years experience on Bucyrus-Monighan, P&H, Northwest and other makes of Steam, Diesel, gas and electric draglines on levee work and phosphate mines. Hold three sets civil service papers with ratings of 70%, 85%, and 100%. Married but can go anywhere. Furnish excellent references. Present location, Louisiana. Box 5903

# :: NOT IN THE CONTRACT ::

John, who was attending a bidding in a distant city, received a telegram from his wife reading, "John, remember you are a married man."

His answer read: "Telegram received too late."

---

Customer: "Why do you have an apple as your trademark? You're a tailor."

Tailor: "Well, if it hadn't been for an apple, where would the clothing business be?"

---

"Your teeth are in bad shape," said the dentist to a patient. "You should have a bridge put in at once."

"How much will a bridge cost?"

"About seventy-five dollars."

"Say, doc, can't I get along with a small culvert?"

---

A pinch of salt is greatly improved by dropping it into a stein of beer.

A letter was sent to a rich manufacturer in the State demanding $50,000 or otherwise his wife would be kidnapped. Through an error the letter was delivered to a poor man of the same name, who replied: "I ain't got no money, but I'm interested in your proposition."

---

Our idea of a soft job is being valet to Mahatma Ghandi.

---

Alarmed wife (whose husband had gone to bed first, but whom she did not find abed when she got there): "Bill, where are you? Bill!"

Drowsy Bill: "Aw, come on to bed. I've been asleep hours."

Mrs. Bill: "But you aren't in bed."

Bill: "Thunder I'm not. I'm where the bed is anyway.

Mrs. Bill: "No darling. You are where the bed used to be. I changed things around today and you are sleeping in the cedar chest."

There's nothing strange in the fact that the modern girl is a "live wire." She carries practically no insulation.

---

With bowed shoulders Homer Smith entered his house. His dragging feet scuffed their way through the front hall and into the kitchen, where his wife was preparing the evening meal.

The smile faded from Mrs. Smith's face as she noted the woebegone appearance of her better half.

Slumping into a chair. Homer Smith stared straight ahead with dead eyes . . . "Tell me, darling" pleaded his wife.

She came over to Homer and lifted his chin in her hand. Homer Smith moistened his lips with his tongue . . . "The worst," he said dismally, "has happened."

"No," cried Mrs. Smith, aghast.

"Yes," said Homer. "This afternoon, just before quitting time, the boss called me in and gave me the business."

# FOR SALE

| RATES: | First insertion rate per column inch | Repeat insertions (no change in copy) rate per column inch |
|---|---|---|
| Up to 3 inches | $4.50 | $4.00 |
| Over 3 and up to 7 inches | 4.25 | 3.75 |
| Over 7 inches | 4.00 | 3.50 |

Rates are net (no commissions, no discounts) and payable in advance of publication. Send your remittance with insertion order and copy.

***Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin***

## Small Shovels
### Under 2 Yards

**1 USED TYPE "B" STEAM SHOVEL,** shop No. 2400; caterpillar mounted; 19 ft. 8 in. boom, 16 ft. dipper handle, ¾ yard dipper. Good condition. Can be inspected any time. Located Sturgis, Michigan. Bargain price. Box 418SS

**MARION MODEL 21 COMBINATION HIGH LIFT STEAM SHOVEL,** ¾-cubic-yard manganese steel dipper, 15-foot dipper handle, 20-foot shovel boom. Also includes 40-foot boom crane equipment including two drums. Boiler retubed and machine is in excellent operating condition. Location about 15 miles from Baltimore, Maryland. Price for immediate acceptance, subject to prior sale, f.o.b. present location—$1,800. Box 396-SS.

**BUCYRUS ERIE** So. Milwaukee, Wis.

**OFFERS FOR SALE OR RENT**

**FACTORY REBUILT and USED SHOVELS--CRANES--DRAGLINES**

**Please send me full details on:**

- ☐ Osgood 1½ yd. Steam Shovel — Bargain.
- ☐ Bucyrus-Erie 1030 —Gas ¾ yard shovel. Rebuilt.
- ☐ P & H 600 1-yd. Shovel-Dragline.
- ☐ Osgood "Conqueror"—Gas Combination Shovel-Clamshell.
- ☐ Bucyrus-Erie 41-B steam 1¼-yd. Shovel. Good condition. Very low price.
- ☐ Monighan Dragline 60-foot boom. Priced right.

Name.....

Address.....

**MARION MODEL 32, shop No. 5459, mounted on "cats," steam-powered, 1¼-cubic-yard dipper, 24-foot boom, 17-foot 6-inch dipper handles.** Box 82-SS.

**BUCYRUS-ERIE TYPE "GA-2" GAS+AIR SHOVEL,** shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. Box 126-SS.

**P. & H. MODEL 206** Gasoline Combination Shovel and Clamshell machine. Good condition. Located vicinity Chicago. Box 336-SS.

**20-B BUCYRUS-ERIE STEAM SHOVEL,** serial number 4000; caterpillar mounted; 18-foot boom, 12-foot 6-inch dipper handle, 1-yard dipper; shipped new in 1923; located western Missouri. Bargain. Box 241-SS.

**THEW "O"** ¾-cubic-yard gas shovel rebuilt 1931 and mounted on new center drive "cat". Box 343-SS.

## CHEAP!

Two 20-B Bucyrus steam shovels. Located Aurora, Illinois. Price each $1500.

30-B Bucyrus steam shovel. Located Charleston, Mississippi. Price $1500. Box 303-SS.

**LORAIN 75B 1½-YD. GASOLINE SHOVEL.** Good mechanical condition. Located Strawn, Texas. Will rent or sell. Box 417-SS

**ONE TYPE "B" BUCYRUS-ERIE STEAM MACHINE,** mounted on "cats", ¾-cubic-yard dipper, shop number 2301, 19-foot boom and 16-foot dipper handle. Box 83-SS.

## BARGAIN

**Bucyrus-Erie Type B** number 1982, ¾-yard steam shovel on caterpillar mounting with dragline attachment. Ideal for Construction work or Placer mining. Good condition, located Colorado Springs, Colo. Price right. Box 362-SS.

**BRAND NEW PAGE DRAG SHOVEL EQUIPMENT** suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17-foot 1½-inch boom, 11-foot dipper handle, and two ¾ cubic-yard dippers; one 38-inches wide over cutters—the other 49½-inches wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 381-SS.

**USED P&H MODEL 700 gasoline,** combination shovel-dragline, shop number 3007, including 1¼-cubic-yard drag scraper bucket. Dragline boom 40-foot plus 10-foot extension, shovel boom 25-foot 10-inches, dipper handle 19-foot 3-inches, dipper 1¼-cubic-yard. Engine Waukesha Type WL 4 cylinder 6¼"x7". Good condition. Some repair parts on hand. Machine located Tilleda, Wisconsin. Box 378-SS.

# FOR SALE

## *Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin*

### Small Shovels
*Under 2 Yards*
Continued

**BUCYRUS-ERIE 20-B steam shovel ¾-yard** Dipper, $850. Chicago territory. Box 348-SS.

**FOUR TYPE B BUCYRUS-ERIE STEAM SHOVELS.** Good operating condition. $1000 each. Box 328-SS.

**ONE 18-B BUCYRUS-ERIE, ⅞-yard dipper on** full revolving caterpillars. Box 182-SS.

**OSGOOD "CONQUEROR" GAS COMBINATION SHOVEL-CLAMSHELL.** Brand New. LeRoi 6-cyl. Engine. Excellent condition. Box 412-SS.

**NORTHWEST SHOVEL,** model 105, caterpillar mounted, 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 84-SS.

**BUCYRUS-ERIE SLIGHTLY USED ½-CUBIC YARD** Rope crowd gasoline shovel. Will demonstrate. Box 282-SS.

**REBUILT GA-2 BUCYRUS-ERIE SHOVEL** mounted on single shaft caterpillar, 1¼-cubic yard inserted tooth dipper, 22-foot 6-inch boom, 16-foot dipper handle, starter. Carries guarantee of new machine. Box 43-SS.

**Lorain 75-B shovel purchased new February, 1932. Worked only six months—just like new. Located in northern New York State. Box 414-SS**

**P&H MODEL 204.** Shop number above 2200 combination Shovel Clamshell. 19' shovel boom, 14' 6" dipper handles, ½ cubic yard dipper, 35' clamshell boom, ½ cubic yard Owens Type M digger type bucket. Both front end equipments less than one year old. Excellent condition. Box 254-SS.

**BYERS BEARCAT,** Model 27, gasoline ½-cubic-yard Skimmer scoop, crane-clamshell and drag shovel with front opening dipper. Engine—4-cylinder, 4"x5" Hercules Model OX. Machine new July 1928. Excellent condition. Box 293-SS.

**TYPE B BUCYRUS-ERIE COMBINATION HIGH LIFT STEAM SHOVEL,** 19-foot 8-inch boom, 16-foot dipper handle, ¾-cubic yard dipper, power boom hoist and 36-foot boom clamshell equipment complete. Located central Indiana. Price as is, f.o.b. present location $2,000. Box 311-SS.

**20-B BUCYRUS-ERIE STEAM SHOVEL.** Machine No. 4145.

**BUCYRUS-ERIE GAS + AIR CRANE** with 40-foot boom, ⅝-yard Page Dragline bucket. Fairleads and shovel boom, no dipper stick. Machine No. 4347.

**TYPE B BUCYRUS-ERIE High Lift** Steam shovel. Machine No. 3110. Box 373-SS.

**BUCYRUS-ERIE 1030,** ¾-cubic-yard rope crowd gasoline shovel. Factory rebuilt and guaranteed. Box 283-SS.

**TYPE B-2 BUCYRUS-ERIE STEAM SHOVEL,** number 9830, mounted on single shaft caterpillar type mounting. Equipped with 21-foot 3-inch boom, 16-foot dipper handle, ⅞-cubic-yard inserted tooth dipper. Boom hoist and Mass. standard boiler. Located vicinity of Boston. Reasonably priced. Box 345-SS.

**BUCYRUS-ERIE** brand new 1035 gasoline shovel, rope chain crowd. Also clamshell or dragline equipment. At price you cannot refuse to consider. Box 356-SS.

**BUCYRUS-ERIE GAS+AIR Combination high** lift shovel and dragline equipment. Chain drive. "Cats." Very good condition. Located vicinity Chicago. Box 337-SS.

**BUCYRUS-ERIE GA-2 SHOVEL**—Single Shaft Cat. 24' Boom, 18' Dipper Handle, 1 cubic yard Dipper. Good operating condition. Box 423SS.

**BUCYRUS-ERIE MODEL 32-B** Gas Chain Crowd Shovel—21' 6" Boom, 16' Dipper Handle, ⅞ yard Cast Front Inserted Tooth Dipper, Wisconsin six-cylinder 5"x6" Engine. Excellent condition. Box 422SS.

**BUCYRUS-ERIE TYPE B** High Lift Steam Shovel—Spur Gear Cat, Power Boom Hoist. Reconditioned. Excellent mechanical condition. Box 424SS.

**BUCYRUS-ERIE TYPE B** High Lift Steam Shovel, Power Boom Hoist. Good condition. Box 425SS.

**BUCYRUS-ERIE GA-2** High Lift Shovel—22'6" Boom, 16' Dipper Handle, 1¼ cubic yard Dipper, four cylinder 6¼"x8" Engine, Single Shaft Cat. Shop reconditioned. Bargain price. Box 426SS.

**BUCYRUS-ERIE 37-B Gas Shovel**—Single Shaft Cat, Chain Crowd, 21'6" Boom, 15' Dipper Handle, 1½ cubic yard Dipper. Field reconditioned. Wisconsin six cylinder 5⅜"x6½" Engine. Suitable for high altitude. Kohler Light Plant, Electric Starter. Box 427SS.

**BUCYRUS-ERIE D-2 Diesel High Lift Shovel**—26' Boom, 17' Dipper Handle, 1 cubic yard Dipper, Atlas four cylinder 6½"x8½" Engine. Excellent condition. Box 428SS.

**AMERICAN Gas Shovel**—21' Boom, 15' Dipper Handle, 1 cubic yard Dipper, Waukesha four cylinder 6"x7" Engine. Bargain price. Box 429SS.

**BAY CITY** Chain Crowd Gas Shovel—15' Boom, 11' Dipper Handle, ⅜ cubic yard Dipper. Also 25' Boom Clamshell Equipment and ⅜ yard Clamshell Bucket. Excellent operating condition. Bargain price. Box 430SS.

**BYERS BEARCAT Gas Shovel**—16' Boom, 12' Dipper Handle, ⅜ yard Dipper, Hercules Gas Engine. Also 30' Boom Dragline Equipment. Good mechanical condition. Price right. Box 431SS.

**P&H MODEL 208**—45' Boom Dragline—100 HP Waukesha Gas High Altitude Engine. Good operating condition. Box 432SS.

**P&H MODEL 207**—40' Boom Dragline—Buda Gas Engine. Field reconditioned. Box 433SS.

**P&H MODEL 600** Gas Shovel—20' Boom, 14'3" Dipper Handle, 1 cubic yard Dipper. Also 40' Boom Clamshell and Dragline Equipment available. 75 HP Waukesha Gas Engine. Bargain price. Box 434SS.

**KOEHRING MODEL 1** Gas 30' Boom Crane—4½"x5" Wisconsin Engine. Box 435SS.

**OSGOOD** Steam Shovel—21'9" Boom, 16' Dipper Handle, 1½ cubic yard Dipper. Good operating condition. Box 436SS.

**BUCYRUS-ERIE 37-B**—1½ cubic yard Shovel, 21'6" Boom, 15' Dipper Handle, Wisconsin six cylinder Gas Engine, Battery Lighting Plant. Factory rebuilt. New machine guarantee. Box 438SS.

**BUCYRUS-ERIE GA-2 SHOVEL**—22'6" Boom, 16' Dipper Handle, 1¼ cubic yard Dipper, Waukesha four cylinder 6¼"x8" Engine—Brand New cylinders. Factory rebuilt. New Machine Guarantee. Box 439SS.

**BUCYRUS-ERIE 43-B**—1¾ cubic yard Chain Crowd Shovel, 22' Boom, 15' Dipper Handle, Wisconsin six cylinder 6"x7" Engine. Factory rebuilt. New machine guarantee. Box 440SS.

**LORAIN 75-B** Shop No. approximately 5000—21' Boom, 18' Dipper Handle, 1¼ cubic yard all cast Dipper, automatic Dipper Trip, Standard center drive Cat, Power Boom Hoist, four cylinder Waukesha 6¼"x8" Gas Engine. New July, 1930. Located Strawn, Texas. Excellent mechanical condition. Box 441SS.

**INDUSTRIAL BROWN-HOIST MODEL "H"**—50' Boom, Steam 8 Wheel Locomotive Crane—50,000 lb. capacity. Good operating condition. Located vicinity Chicago. Box 442SS.

**BUCYRUS-ERIE TYPE B-2** High Lift Steam Shovel and 40' Boom Clamshell Equipment. Single Shaft Cat. Good operating condition. Box 420SS.

**BUCYRUS-ERIE GA-2 SHOVEL**—24' Boom, 16' Dipper Handle, 1 yard Dipper, Single Shaft Cat, Massachusetts Air Tank. Excellent condition. Box 421SS.

**P&H MODEL 600**—1-yard Gasoline Shovel. Three years old. Excellent condition throughout. Just been thoroughly overhauled. Will sacrifice at bargain to responsible buyer. Located in Wisconsin. Box 363-SS.

**BUCYRUS-ERIE 41-B STEAM SHOVEL**—21 foot boom, 15 foot dipper handle, 1¼ cu. yd. dipper. Good operating condition. Box 406-SS

### Small Draglines
*Under 2 Yards*

**MONIGHAN 60 FOOT BOOM DRAGLINE** mounted on 1-W walking device—Waukesha 5¾x8, 4 cyl. gas engine, also 1¼ yd. Page bucket. Good operating condition. Box 408-SD

**P & H Model 206 B Dragline.** Good operating condition. Very favorably priced. Box 390-SD.

**BUCYRUS-ERIE GAS+AIR combination high** lift dragline and shovel. Chain drive. "Cats." Excellent condition. Located vicinity Chicago. Box 337-SD.

**BUCYRUS-ERIE E-2 DIESEL DRAGLINE,** caterpillar mounted, 50-foot boom, 1¼-cubic-yard Omaha bucket, Kohler lighting plant. Machine was new in July 1930 and has been used less than 6 months. Box 243-SD.

**P&H MODEL 700 USED GASOLINE COMBINATION DRAGLINE-SHOVEL,** shop number 3007, 40-foot dragline boom plus 10-foot extension and 1¼-cubic-yard drag scraper bucket. 25-foot 10-inch shovel boom, 19-foot 3-inch handle and 1¼-cubic-yard dipper. Waukesha Type WL 4 cylinder 6¼"x8" engine. Good condition. Some repair parts on hand. Machine located Tilleda, Wisconsin. Box 378-SD.

**30-B BUCYRUS-ERIE DIESEL DRAGLINE** with 40-foot boom and 1-cubic-yard bucket located in Alabama. Box 91-SD.

**P & H MODEL 700 DRAGLINE;** number 2894 equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with 4-cylinder Atlas Diesel engine. Box 189-SD.

**P & H DRAGLINE MODEL 700;** number 2456 equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with a Waukesha gasoline engine. Box 190-SD.

**FOR SALE OR RENT**

**One practically new Bucyrus-Erie Model E-2 Dragline, Diesel driven, equipped with 50' boom and 1½-yard Omaha dragline bucket, now located at Shenandoah, Iowa. Box 244-SD.**

**P&H MODEL 600 GAS DRAGLINE.** 40 foot boom. 75 H.P. Waukesha gas engine. Also available clamshell equipment; shovel equipment with 20 foot boom, 14 foot 3 inch dipper handle and 1 cubic yard dipper. Bargain price. Box 434SD.

**BUCYRUS-ERIE 30-B** Diesel—40' Boom Dragline Box 437SD

**BYERS BEARCAT GAS DRAGLINE** with 30 foot boom. Hercules gas engine. Also shovel equipment including 16 foot boom, 12 foot dipper handle and ⅜ yard dipper. All in good mechanical condition. Price right. Box 431SD.

# FOR SALE

***Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin***

## Small Clamshells and Cranes
*Under 2 Yards*

**MARION MODEL 21 HIGH LIFT STEAM CRANE** with 40-foot boom equipment including two drums. Also has 20-foot shovel boom, 15-foot dipper handle and ¾-yard manganese steel dipper. Boiler retubed and machine is in excellent operating condition. Located about 15 miles from Baltimore, Maryland. Price for immediate acceptance, subject to prior sale, f.o.b. present location—$1800. Box 396-SCC.

**GENERAL 35-FOOT BOOM CLAMSHELL MACHINE** and ½-cubic-yard Lakewood bucket. Equipped with four cylinder Buda gasoline engine. Machine new September 1929. Box 335-SCC.

**P&H MODEL 600 GASOLINE CLAMSHELL MACHINE.** 40 foot boom. 75 H. P. Waukesha gas engine. Also dragline equipment and shovel equipment including 20 foot boom, 14 foot 3 inch dipper handle and 1 cubic yard dipper. Bargain price. Box 434SCC.

**BAY CITY CLAMSHELL MACHINE,** 25 foot boom and ⅝ yard clamshell bucket. Excellent operating condition. Bargain price. Also chain crowd shovel equipment with 15 foot boom and 11 foot dipper handle—⅝ cubic yard dipper. Box 430SCC.

**P. & H. MODEL 206** combination clamshell and shovel. Located near Chicago. Good condition. Box 336-SCC.

**BUCKEYE CLAMSHELL-CRANE,** gasoline driven, caterpillar mounted, equipped with 30-foot boom, ⅝-cubic-yard clamshell bucket, fairleads and backfiller scraper. Located in Milwaukee, Wisconsin. Box 371-SCC.

**BUCYRUS-ERIE—SLIGHTLY USED LOADMASTER TRACTOR CRANE 14' BOOM—** Rubber tired Wheels—Rated Lifting Capacity 4500 lbs. McCormick Deering Power Unit—New machine guarantee. Box 410-SCC.

**LITTLE GIANT CRANE**—Gas—Caterpillar Model C. Type B—¾-yd. bucket. Recently overhauled. Now working. $1,500.

**BROWNHOIST CRANE** — Gas — Cats. Model 2-C. Serial No. 8829. 1-yd. bucket. Good working condition. $1,500.

**McMYLER MODEL J. LOCOMOTIVE CRANE**—35 Ton Steam. 50 and 75-ft. Boom. 1½ or 2-yd. buckets. New boiler and swinging engine recently installed. A real crane for long reach and heavy work. Thoroughly overhauled condition. $4,500.

Box 346-SCC.

## Large Shovels and Draglines
*2 Yards and Over*

**CLASS 14 STEAM-DRIVEN DRAGLINE.** New 1922. Shop number about 3700. Mounted on skids and rollers. Equipped with 60-foot boom, 2-cubic-yard bucket and electric light plant. Located western Iowa. Priced to sell. Box 395-LSD.

**50-B STEAM SHOVEL,** Number 3946; equipped with 1½-cubic-yard dipper, 26-foot boom, also 1½-cubic-yard dragline bucket with 50-foot boom caterpillar mounted, equipped for burning oil, located at Texarkana, Ark. Price very reasonable. Box 112-LSD.

**BUCYRUS-ERIE SHOP REBUILT 100-B STEAM SHOVEL;** shop number 4890; 29-foot 6-in. boom, 20-foot handle; three-cubic-yard dipper. Can be inspected at So. Milwaukee, Wis. Priced to sell. Box 187-LSD.

### For Sale or Rent

**ONE CLASS-14 STEAM DRAGLINE** excavator. Number 3402, 70-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas or oil. Priced very reasonable. Located at Grand Prairie, Texas. Box 110-LSD.

**68-C BUCYRUS ELECTRICALLY OPERATED SHOVEL,** equipped with 2½-yard manganese front dipper, 3 phase, 60-cycle, 440-volt motors, transformers, cable reel and approximately 1400 feet of cable, all in excellent condition. Reasonable price. Address Box 268-LSD.

### 6-YD. SHOVEL

**BUCYRUS-ERIE 320-B** electric shovel, Ward-Leonard control, 3 phase, 60 cycle, 2300 volts, equipped with 6-cubic-yard dipper, 85-foot boom and 58-foot handles. Is in good condition and may be inspected in operation. Reasonably priced. Box 279-LSD.

### What Do You Bid On a

**70-C STEAM SHOVEL** located near Marietta, South Carolina, where it completed a railroad job? Bargain as supplementary shovel or as supply of spare parts.

**88-C STEAM SHOVEL** located in Kansas. Carefully laid up after completing season's work. 3½-yard dipper. Fine condition. Any reasonable offer accepted. Box 52-LSD.

### FOR SALE

**CLASS 14 STEAM DRAGLINE** with 2-yard Page bucket. Location Iowa. Very good condition. Surprisingly low price f.o.b. cars.

ALSO

**2-YARD MONIGHAN STEAM DRAGLINE** in fair condition—cheap. Box 419LSD

**70-TON STEAM SHOVEL** mounted on "cats," caterpillars in good condition. Located near Hazelton, Pa. Box 162-LSD.

**50-B STEAM SHOVEL,** new March 1927. Shop number about 4950. Has 26-foot boom, 17-foot dipper handle and 2-cubic-yard dipper. Priced to sell. Box 240-LSD.

### 225-B OWNERS

You may be interested in a partial Bucyrus-Erie 225-B steam shovel located in Kentucky coal fields as a source of spare parts. No reasonable offer refused. Box 211-LSD.

**MONIGHAN STEAM DRAGLINE,** with 123-foot boom, 3½-cubic-yard bucket, mounted on skids and rollers, located southeastern Iowa. Box 367-LSD.

**MONIGHAN DRAGLINE MODEL T,** 2-cubic-yard 60-foot boom located near Wichita, Kansas, where it is now working. About seven years old. Has recently been thoroughly overhauled. Box 180-LSD.

**DIESEL-ELECTRIC DRAGLINE**

**Class 14 Diesel electric dragline, Shop Number 5079, new fall of 1927 with 70-foot boom, 2-cubic-yard bucket, and with extra 10-foot extension, western location.** Box 296-LSD.

**50-B BUCYRUS-ERIE ELECTRIC SHOVEL,** equipped with 3-phase A. C. current, 550 volts, 60 cycle and has three motors. New Manganese steel dipper. Located South Carolina. Box 226-LSD.

### PRICED FOR QUICK SALE

**50-B BUCYRUS-ERIE ELECTRIC DRAGLINE.** Located in Texas. Box 416-LSD.

**2½-YD. DRAGLINE**

Class 220 Page Dragline; 100 H. P. Charter-Horizontal Twin Cylinder engine; 72-foot boom; 2½-cubic-yard Page bucket. Located Northwestern Indiana. Box 200-LSD.

**85-C STEAM SHOVEL,** on caterpillar mounting, caterpillars in good condition, price $2,500. Located near Hazelton, Pa. Box 163-LSD.

### For Sale or Rent

**ONE CLASS-14 STEAM DRAGLINE** excavator Number 3327 60-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas or oil. Price very reasonable. Located at Turkey Creek, La. Box 111-LSD.

**70-C BUCYRUS STEAM SHOVEL** on Cats. Complete. In operating condition. Shop number 1712. Also one extra three-yard Manganese dipper. $2,000. Chicago territory. Box 347-LSD.

**175-B STEAM SHOVEL** No. 4090, equipped with 75-foot boom, 48-foot dipper handle and 3½-cubic-yard dipper. Machine is in very good condition. Oversize boiler. Box 148-LSD.

### 3-YD. SHOVEL

**BUCYRUS 78-C,** caterpillar mounted; three-cubic-yard dipper; shop number 3611. Boom rebuilt last year. Equipped with new 103-C boiler and will pass boiler inspection in any state. Shovel is in very good condition and is in operation at present time. Box 326-LSD.

**BUCYRUS 320-B STEAM STRIPPING SHOVEL,** shop number 4205, new in 1925, used less than four years. Located at Toronto, Ohio. Box 74-LSD.

**BUCYRUS 80-B STEAM SHOVEL,** shop number about 3800; 2-cubic-yard dipper; 48-foot boom; 32-foot dipper handle. "Cat" mounted. Priced to sell. F.o.b. cars. Box 255-LSD.

**TYPE 175-B ELECTRIC,** No. 794 equipped with 87' shovel boom, 48' dipper handle, 3½-yd. bucket, and dragline equipment including 125' boom, and 3½-yd. bucket. This machine was recently reconditioned and is in good operating condition. Present location, Connecticut. Box 263-LSD.

**BUCYRUS 70-C,** Shop number around 1500. Thoroughly overhauled. Good working condition. Eastern location. Box 299-LSD.

**CLASS-24 BUCYRUS-ERIE STEAM DRAGLINE,** shop number 912; 115-foot boom, 3½-cubic-yard Page bucket. Florida location. Box 73-LSD.

# FOR SALE

***Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin***

## Miscellaneous Equipment

**TWO BARBER-GREENE LOADING MACHINES.** Priced extremely low for quick sale. Box 415-ME.

**4 LA PLANT CHOATE** 6-yard, all-steel, dump wagons. Equipped with wide iron wheels. Price $200.00 each. Chicago territory. Box 349-ME.

## For Sale or Rent

Two 40-ton, 6-wheel switchers. Recently overhauled and rebuilt. Two 50-ton, 6-wheel switchers. In excellent condition. Location Chicago. Box 306-ME.

## LOCOMOTIVES

**8 BALDWIN**, 17x24, straight drive standard gauge 45 ton locomotives. 54 inch boilers. Shop numbers from 32,750 to 34,611. Each one has passed State Boiler Inspection yearly. Boilers will stand cold water test of 240 lbs. At present in actual service in Minnesota mine.

**2 BALDWIN** Locomotives, 19x26, standard gauge, 6 wheel switching type, shop numbers 39534 and 39536. Box 152-ME.

**COMPLETE EQUIPMENT** for 2 strip mines, contractors or quarry operations, No. 300 and No. 36 Marion steam shovels, well drills, locomotives, cars, crushers, picking tables, loading booms, cable and button retarders, compressors, motors, transformers, flood and search lights, camp equipment and new repair parts for above. Box 195-ME.

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Offered for sale by Southern contractor. Priced to sell.

**7—Railroad Type Steam Shovels 2½ to 5 yd.**
**3—Full Revolving Shovels ¾ yd.**
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**3—Camp Cars**
**1—Flat Car**
**2—1-bag Gasoline Concrete Mixers**
**Pumps, Boilers, Jacks and Other Tools**

For further particulars, Address Box 138-ME.

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**For inquiry on supplies and equipment not advertised another postal card addressed to us is provided. Check plainly *only* those items in which you are interested. *Excavating Engineer* will be pleased to serve you in forwarding your inquiry to manufacturers.**

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"JACKBITS" drill faster and further because each is of perfect shape, accurately gauged and scientifically heat-treated in modern precision equipment.

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*Stock shipment from any I-R branch or dealer.*

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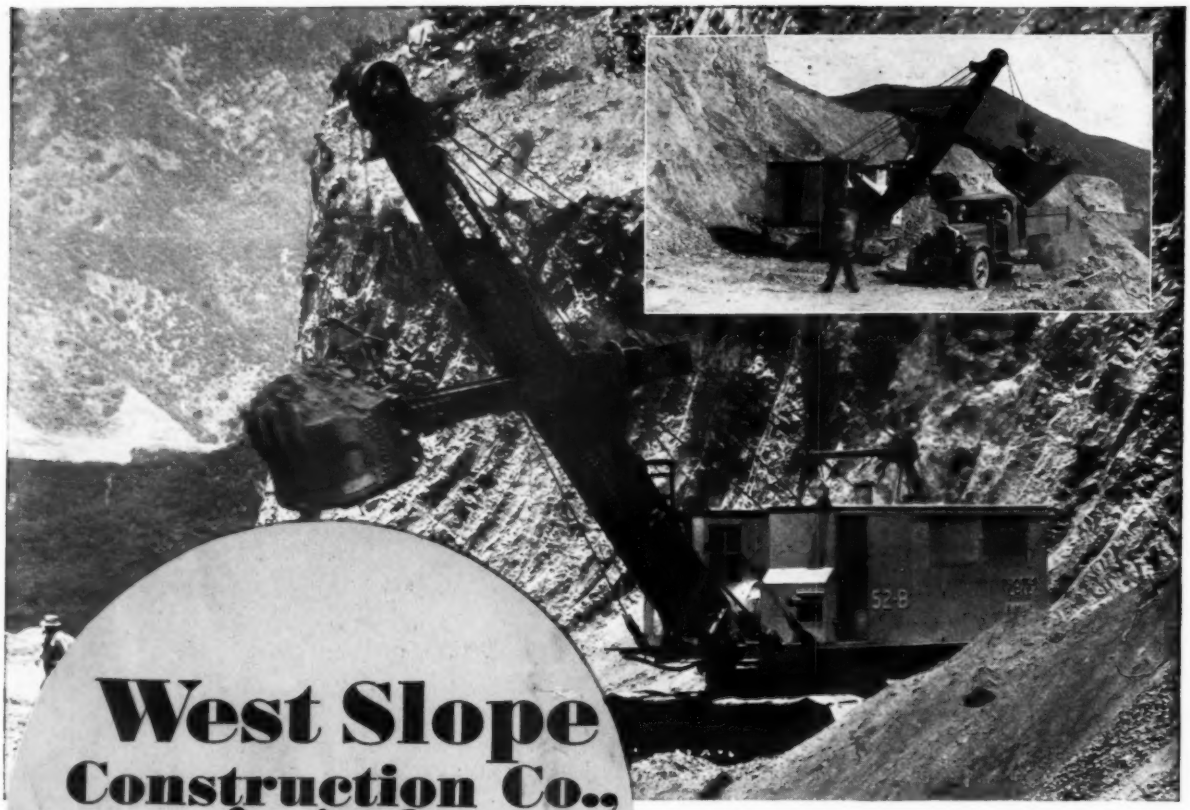
For your convenience in writing to Ingersoll-Rand Company, you will find a card bound in this issue.



# West Slope Construction Co., Selects Bucyrus-Eries

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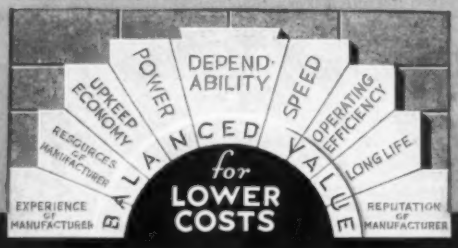


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West Slope Construction Company consists of a combination of Foley Bros., Inc., Bates and Rogers Construction Company, Inc., J. C. Maguire, and The Lawler Corporation. Naturally these thoroughly experienced contractors gave careful consideration to the Bucyrus-Erie complete line. Orders followed for a 37-B gas, two 52-B Diesels, two 120-B electrics and another 52-B Diesel.

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It will pay you to investigate what Bucyrus-Eries can do on your job.

BUCYRUS-ERIE CO., South Milwaukee, Wis.

649

See BUCYRUS ERIE before you buy!

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